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PRIORITY HEALTH PROBLEMS OF MICHIGAN FOR 1979-80

IN
IMPLEMENTATION OF PART 23
OF THE
PUBLIC HEALTH CODE
(Public Act 368 of 1978)

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

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PRIORITY HEALTH PROBLEMS OF MICHIGAN

for

1979-80

This report was prepared in accordance with Section 2301, Act No. 368 of 1978, the Public Health Code: "The department ...annually shall identify the priority health problems of this state..."

Michigan Department of Public Health
3500 N. Logan St., Box 30035
Lansing, Michigan 48909

August 1979

PREFACE

The department, utilizing broad participation of, and providing ample opportunity for the submission of recommendations by (the legislature, health planning agencies, local health departments, local government entities, health professional associations, and the public), annually shall identify the priority health problems of this state, utilizing state health plans and an assessment procedure based on data and statistics... From these priorities, the department annually shall prepare a proposed list of basic preventive, personal, and environmental health services to be made available and accessible to all residents in need of the services in this state without regard for place of residence, marital status, sex, age, race, or inability to pay.[1]

This report, "Priority Health Problems of Michigan, 1979-80," is part of the Basic Health Services provision of the Michigan Public Health Code -- probably the most comprehensive and significant public health legislation enacted in the nation. By identifying and studying the health problems of the state, by identifying services needed to address these problems and guaranteeing these services to every Michigan resident in need, and by involving broad participation in this identification, the state has embarked on a truly dramatic new program.

HEALTH PROBLEMS

This first effort began with the preparation by the Department of a preliminary description of perceived health problems in Michigan. The description drew upon a wealth of material prepared in the past by state and local agencies, as well as on national sources of information and research studies. Some 30 problem areas were included, under the broad headings of health status problems, environmental health problems, and health system problems. A special State-Local Committee was appointed to guide and evaluate this development, and to recommend criteria for determining which problems were to be considered priorities.

Work began immediately on assembling statistical and other scientific information to further define the scope, severity, and importance of the problems, in accordance with the recommended criteria. At the same time, a comprehensive state-wide review was carried out, which, because of time constraints in this first year of the Code, could make use of only a limited portion of the data which are now presented in this report.

Local health officers took the responsibility for seeking the broad participation of consumers and providers in all parts of the state in responding to the health problems description.

Meetings were held with Michigan's Health Systems Agencies and members of the Statewide Health Coordinating Council, to assure that the current problems

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[1] See Section 2301 of Act 368, P.A. 1978. Data and statistics to be used are specified in Sections 2616 and 2617.

identified for the Basic Health Services implementation were consistent with problems noted in the broader framework of area and state-wide health plans developed by the planning agencies.

The document was reviewed by program staff in the Department of Public Health, and finally, by a special committee established to assess all of the information provided, and to recommend revisions in the overall content. Through this process, the list of problems was amended and clarified, the general descriptions were supplemented by identification of key elements of the problems, and the first steps were taken towards linkage of problem identification to the identification of services.

HEALTH SERVICES DETERMINATION

A review of the priority health problems led to development of an initial list of services considered necessary to contain, minimize, eliminate, or prevent the problems. Those services currently mandated by law were noted. As part of the review process information about currently existing services was obtained -- the service deliverers, the sources of funding, and the adequacy of the services in addressing the health problems. Based on this review, and on the recommendations of the special established committee, a list of basic services was proposed which address priority health problems.

Through the appropriation process, the legislature made a final determination of those services which were to be designated as basic for 1979-80, and provided funds to support the state/local cost-sharing programs. The Public Health Code provides that the Department of Public Health will reimburse local governments for reasonable costs of delivering certain groups of services, subject to funds appropriated for this purpose: required services, which include both mandated services designated for delivery through local health departments, and the identified basic services which the local health departments deliver; and allowable services which may be recommended in particular areas but are not required throughout the state. The necessary agreements with each local health department are now being developed.

An important additional responsibility of the Department, in the health problems/ health services cycle, is a periodic determination, through a survey of the population, of the extent to which the designated basic services are indeed available and accessible to all residents in need of the services in this state.

With this report, the Department is completing the initial detailed documentation of the priority health problems of Michigan, as part of the annual process prescribed by the Code. I urge you, therefore, to review this document either individually or with organizations or other groups, and to share with me your questions, suggestions, or criticisms so that we can maintain continued broad participation in revising, updating, and shaping this, or future, priority health problem determinations.

Maurice S. Reizen, M.D.
Director

CONTENTS

Preface 1

Introduction 5

Summary 7

HEALTH STATUS PROBLEMS 15

COMMUNICABLE DISEASE PROBLEMS 17

Introduction 17
Diseases that can be prevented or controlled through immunization 18
Venereal disease problems 25
Tuberculosis 29
Communicable disease hazards due to environmental factors 31

CHRONIC ILLNESS 35

Introduction 35
Health-related behavior and living conditions linked with chronic illness 43
Cardiovascular diseases 51
Cancer 54
Renal disease 58
Metabolic and degenerative diseases 60

PROBLEMS OF PREGNANCY, BIRTH, AND DEVELOPMENT 63

Introduction 63
Problems related to pregnancy and delivery 64
Problems of infancy and development 69
Unintended and unwanted pregnancies 73

MENTAL AND EMOTIONAL HEALTH PROBLEMS 77

Introduction 77
Mental illness and emotional disturbances 78
Mental retardation and related developmental disabilities 82

OTHER HEALTH STATUS PROBLEMS 85

Vision, hearing and speech problems 85
Dental problems 89
Nutrition problems 92
Accidents 96
Alcohol and drug dependence 100

CONTENTS

ENVIRONMENTAL HEALTH PROBLEMS 105

Introduction 105
Toxic chemicals in the environment 109
Contamination of water and food supplies 116
Hazards in the workplace 120
Exposure to ionizing radiation 125
Problems related to housing and other living conditions 128

HEALTH SYSTEM PROBLEMS 131

Problems related to availability and accessibility of services 131
Maldistribution of health professionals 140
Problems of cost, quality control, and appropriate use of resources 146
Lack of information to support decision-making 150
Inadequate health knowledge 152

REFERENCES USED 155

This report is responsive to Michigan's Public Health Code, Act 368, Public Acts of 1978, as amended (Section 2618), which provides that "The department shall publish and make available periodically to agencies and individuals health statistics publications of general interest, publications bringing health statistics into focus on priority programmatic issues and health profiles."

INTRODUCTION

To examine the health problems of Michigan, and to determine which should be considered priority health problems, the following criteria were used:

> The frequency of occurrence, or the prevalence of the problem, or the potential frequency or prevalence of the problem in the absence of preventive or control measures.
>
> The impact of the problem.
>
> The severity of impact of the problem on an individual, including health and economic factors; limitations in normal daily activity; limitations in education and employment; pain, suffering, or disability; and costs of care.
>
> The severity of impact of the problem on the community as a whole, including cost to the community, contagion, contamination of the environment, and loss of labor. The threat or seriousness of the problem as perceived by the population of the state.
>
> Community concern about the problem.

The report organizes the problems into three groups: health status problems (those which contribute to morbidity and mortality), environmental health problems (those which hinder the assurance of a healthful environment), and health system problems (those which hinder the availability and accessibility of quality health services at a reasonable cost). The problems, for the most part, are not distinct from one another; thus elements of these problems may be cited in more than one part of the report. To avoid repetition, many of the problem descriptions make reference to discussion which appears under another heading.

This description of health problems is the first to be developed as part of the implementation of the Public Health Code. As workers in the health field know, it is often difficult to obtain statistical data that will delineate the frequency or prevalence of individual health problems, to document their impact, or to measure the extent of community concern. In preparing the report, efforts were made to obtain data for the state of Michigan or for areas within the state; or to obtain reliable national or regional statistics that could be used to estimate the problems in Michigan. In some cases the only evidence available was from isolated studies, inference based on scientific knowledge, or estimation by experts based on fragmented information. The objective was to respond as closely as possible to each of the criteria for each problem area discussed.

Since the problem identification is an ongoing process, the documentation is expected to evolve and improve in the years ahead as better sources of information are discovered, or better analytic techniques are applied. In addition, the development of a comprehensive health information system -- also a requirement of the Public Health Code -- will address some of the

information gaps in the problem identification. It should be noted, however, that for many health problems -- particularly in the relation between the environment and illness -- the documentation of problems in Michigan must await the solution of measurement and methodological issues for society as a whole.

The sources of information used are listed at the end of the report.

Rita Zemach, Ph.D.
Editor
Chief, Office of Statistics Research
and Evaluation
Michigan Department of Public Health
August, 1979

SUMMARY

Priority Health Problems of Michigan, 1979-80

This section summarizes the health problems that are discussed in greater detail in the remaining sections of this document.

A. Health Status Problems

Communicable disease problems

Over the years, incidence and mortality rates of several communicable diseases have fallen markedly, due to immunization of children, development of outbreak containment methods, and improvement of sanitation and drugs. Nevertheless, during 1978, there were more than 200,000 cases of commonly-reported communicable diseases in Michigan.

1. Diseases that can be prevented or controlled through immunization

   Diseases in this category include poliomyelitis, measles, rubella, mumps, diphtheria, tetanus, pertussis, and smallpox.

   In 1978, Michigan led the country in the number of cases of measles and rubella reported; for measles, mumps and rubella combined there were more than 13,000 illnesses. Fewer than 90 percent of Michigan children have a complete immunization series at the time of school entry, and 20 percent of all two-year-olds surveyed in 1977 lacked complete protection against polio and mumps. The vaccine-preventable diseases can cause severe illness, and may lead to serious, life-long disability.

2. Venereal diseases

   Venereal disease is the principal uncontrolled form of communicable disease in Michigan today. It is estimated that there were about 136,700 cases of gonorrhea in 1976. Chlamydia infections are frequently the cause of nongonococcal and postgonococcal urethritis and the venereal disease lymphogranuloma venereum. The estimated number of cases of nongonococcal urethritis in Michigan each year is 40,000. Syphilis causes many hospitalizations and about 10 deaths per year, and diseases such as genital herpes and trichomoniasis are an increasing problem.

   In addition to causing serious illness, venereal diseases can be transmitted to newborn infants.

3. Tuberculosis

   While reduced markedly in the last two decades, tuberculosis remains a problem, particularly among some lower-income groups. In 1977, there were 1,290 new cases reported in Michigan, requiring testing of nearly 12,000 contacts. It is estimated that the known cases may be only a fraction of the actual number of persons with TB.

4. Communicable disease hazards due to environmental factors

Many of Michigan's residents are subject to special risk of communicable disease because of the environments in which they live. Specific environmental risks affect virtually all of the population. Examples are water-borne and food-borne diseases, common cause of non-fatal illness; diseases carried by insects and rodents; and diseases resulting from poor sanitation and crowding. In 1978, there were 1,155 cases of salmonellosis reported in the state, as evidence of these problems.

Hospital-acquired infections are estimated to affect 5 percent of all short-term hospitalizations, resulting in increased illness, or even deaths, and higher costs of care.

Chronic disease problems

In recent decades, with infectious diseases coming under control, chronic diseases have become the leading causes of death and disability. Heart disease, cancer, and stroke account for 68 percent of all deaths in Michigan.

1. Health-related behavior and living conditions linked with chronic illness

Many of the major chronic disease problems appear to be related to individual behavior and life style. Smoking is practiced by some 40 percent of adult men and 29 percent of adult women, and regular smoking is increasing among teenagers. A substantial portion of the population (20 to 30 percent) is well above their ideal weight. Less than half of the population exercises regularly. Studies have shown that behavior such as smoking, overeating, and lack of exercise increase the likelihood of chronic illness.

2. Cardiovascular disease

More than 36,000 people die in Michigan each year of some malfunction of the heart or blood vessels, and this represents 50 percent of all deaths in the state. An estimated 975,000 adults suffer from hypertension, and an estimated 1.4 million persons in the state have some degree of limitation in their daily activities due to heart disease.

3. Cancer

In 1977, more than 15,000 persons in Michigan died of cancer, which is the second leading cause of death. Cancer death rates have increased steadily in recent years, with more than half of the deaths due to tumors of the digestive or respiratory

systems. Cancer is painful, requires long and expensive treatment, and has a severe impact on families as well as victims.

4. Renal disease

Renal disease was responsible for 850 Michigan deaths in 1977, with more than 3,300 deaths occurring in which renal disease played a contributory role. Because of the high cost of treatment of end-stage disease, it is classed as a "catastrophic illness".

Kidney disease is a major cause of work loss for women, and causes limitations in activity for an estimated 1.2 percent of the population.

5. Metabolic and degenerative diseases

Principal problems among the metabolic and degenerative diseases are diabetes and arthritis. In 1977, diabetes mellitus caused the death of 1,615 Michigan residents, and is estimated to affect 5 percent of the population. Arthritis is a major cause of disability, with an estimated 1.5 million people suffering from arthritis in the state.

Problems of pregnancy, birth, and development

Infant and maternal mortality rates have dropped sharply during this century, and the vast majority of Michigan births are without complication. Nevertheless, there are still many births in circumstances that pose a high risk for both mother and child. These include births to very young, often unmarried, women; children born with handicapping conditions; and unwanted pregnancies.

1. Problems related to pregnancy and delivery

An estimated 10 to 15 percent of Michigan births (about 13 to 19 thousand or more each year) fall into a high-risk category. In 1977, there were more than 23,000 births to women under the age of 20, with 288 of these women having received no prenatal care, and more than 2,000 of their babies weighing 5½ pounds or less. There were 1,306 births in 1977 with at least one congenital anomaly noted at the time of birth. During the period 1974-76, there were 8,057 perinatal deaths occurring in Michigan.

2. Problems of infancy and development

There were 1,945 infant deaths in Michigan in 1977, with congenital anomalies and Sudden Infant Death Syndrome being the leading causes of death. The number of infants who were damaged during the perinatal period, but lived, is thought to be several times higher than the number of deaths. About 40 percent of all severe cases of mental retardation result from factors which impact during the perinatal period.

Many children also suffer from handicapping conditions such as neurological disabilities, vision or speech or hearing defects, cerebral palsy, epilepsy, learning or behavior disorders, or combinations of these. Infants and children are also affected by genetic disease.

3. Unintended and unwanted pregnancies

Increased teenage sexual activity, coupled with lack of accurate information about reproduction and inconsistent use of contraceptives, has resulted in a large number of teenage pregnancies and an increase in births to unwed mothers. Many of the mothers who are in their teens and are unwed have repeated pregnancies. In 1977, there were 23,011 births to Michigan mothers under 20 years of age, with the total number of adolescent pregnancies estimated to be more than 70 percent greater than the number of births reported.

Mental and emotional health problems

Mental illness and emotional disturbance cause dysfunction and disability, with an estimated one person out of ten requiring mental health services at some time. Mental retardation and related developmental disabilities impair the ability of many persons to learn and to adapt to the demands of society.

1. Mental illness and emotional disturbance

Mental illness is estimated to affect 10 to 15 percent of the population. In 1977, suicide was the 8th leading cause of death in Michigan and homicide was the 10th leading cause, with many of these deaths related to emotional disturbance. Child and spouse abuse are prevalent, but greatly under-reported. In 1977 there were about 27,400 reports of alleged abuse or neglect of children in the state.

2. Mental retardation and related developmental disabilities

Developmental disabilities include cerebral palsy, epilepsy, and autism, in addition to mental retardation. There are an estimated 407,480 developmentally disabled persons in Michigan (4.39 percent of the state's population). Approximately half of these individuals are substantially handicapped.

Other health status problems

1. Vision, hearing and speech problems

About 3 to 5 percent of Michigan children have a hearing loss that is handicapping or potentially handicapping. Each year, approximately 20,000 Michigan children enter school for the first time with defects of vision, with over a million children

(40 percent of the child population) needing treatment for defective vision by age 17. Vision and hearing impairments are among the most frequently reported chronic conditions for elderly people, with impaired speech reported as a frequent problem among persons in nursing homes.

2. Dental problems

Almost all of the population suffers from dental problems such as dental decay. More than 11 percent of the state's population are missing all of their upper and lower teeth. In areas with unfluoridated water supplies, half of all children have one or more decayed teeth by age 3, and 70 percent have 3 or more decayed teeth by age 4. By age 55, 83 percent of the population has experienced peridontal disease.

3. Nutrition problems

Obesity, underweight, growth underachievement and anemia are the principal nutrition related health problems of the general population in Michigan. A statewide review of height and weight data obtained from participants in the Early and Periodic Screening, Diagnosis and Treatment program indicates that growth underachievement and obesity are health risks. Persons with chronic disease also have acute and chronic nutritional needs. Without government supported food programs, it has been estimated that 1.5 million Michigan residents would be in danger of serious malnutrition.

4. Accidents

Accidents are the fourth leading cause of death in the state and result in widespread injury and disability. Accidents are the leading cause of death among young people. In 1977, 3,945 persons died of accidents in Michigan, with half of these deaths due to motor vehicle accidents.

5. Alcohol and drug dependence

An estimated 750,000 Michigan residents require services because of alcohol and drug dependence. Alcohol use is greatest among the young adult group, age 18-24. Use of alcohol and drugs results in death and disability, work loss, disruption of family life, and accidents, especially motor vehicle accidents.

B. Environmental Health Problems

Multiple use of the state's environment, for industry, agriculture, and recreation, results in unique problems related to environmental contamination.

1. Toxic chemicals in the environment

Use of toxic chemicals in industry and agriculture has led to problems of contamination of the state's air, water, and land, with pesticides, methyl mercury, polychlorinated and polybrominated biphenyls, dioxins, and other chemicals, as well as the long-recognized problem of lead poisoning. Potentially toxic chemicals are known to be in the blood and tissues of most of the state's population, but, except for lead poisoning, human health effects are difficult to identify.

2. Contamination of food and water supplies

All Michigan inhabitants are at potential risk of exposure to water-borne and food-borne diseases, and to toxic substances in food and water supplies. Recognized disease outbreaks are rare, but can result in serious or fatal illness. Water- and food-borne disease, however, is considered to be the most common form of non-fatal illness today, with the exact number unknown because the illnesses are unreported. Contamination of food and water supplies is considered to be a major cause of discomfort, suffering, work loss, and medical costs.

3. Hazards in the workplace

Forty percent of Michigan's population is employed, in more than 190,000 work places. The manufacturing industries, with about 36 percent of the work force, provide the greatest number and variety of potential hazards, but all types of workers are affected.

Approximately one worker in ten suffers a job-related injury requiring treatment, work loss, or job transfer. Only five percent of the reported cases (about 18,500 per year) are due to illness; however, most occupationally-caused illnesses develop over an extended period of time, and the occupational origin is difficult to detect. Researchers estimate that half of all cancer cases are due to, or complicated by, occupational factors. Hazards common in the workplace include toxic and carcinogenic chemicals, dust, noise, heat, and stress.

4. Exposure to ionizing radiation

Of the total of 6,815 facilities or services in Michigan in September, 1978 which were sources of ionizing radiation, 92 percent were X-ray facilities. Medical and dental diagnostic radiology are considered to account for 90 percent of the man-made radiation dose to which the population is exposed. An increasing number of industrial applications are being developed which involve the

use of ionizing radiation, resulting in an increasing risk of exposure. Leukemia and other cancers are known to be among the most serious long-range risks of excessive radiation, with evidence of other damaging or life-shortening effects.

5. Problems related to housing and other living conditions

Many of the environmental problems affect the housing and general living conditions of Michigan's population. Their combined impact means that some residents of the state live their daily lives in conditions that constitute a health hazard. Impoverished urban and rural areas are especially vulnerable to toxic contamination, unsafe water supplies, or insect and rodent disease carriers.

Agricultural labor housing, mobile home parks, and campgrounds are also environments where crowding and inadequate sanitation may present health hazards.

C. Health System Problems

Michigan has a comparatively well-organized health care system to serve its residents, despite the great complexity of services that it offers. High-quality services are not uniformly available, however, and certain health system problems affect Michigan as well as most areas of the United States.

1. Problems related to the availability and accessibility of services

An estimated 10 percent of the population, almost a million people, experience some problem in getting medical care during a given year. Problems include difficulty in finding a doctor, delays in getting appointments, cost, inconvenient hours, lack of transportation, or, in some cases, not knowing where to go. Care is often fragmented or inadequate, even for those who do find access.

Efficient and effective emergency care is not available in some areas of the state; in 1976, only 63 of Michigan's 83 counties met minimum standards for response time of emergency vehicles. Only about 54 counties meet minimum standards for availability of intensive care services.

Public health services vary from one area to another, both in the types of service available, and in the types of personnel providing services.

2. Maldistribution of health professionals

Approximately 9 percent of the state's population live in areas that are designated as medical service shortage areas, with additional areas that are also probably medically underserved.

Among the supply of Michigan physicians, there is also a maldistribution among specialties, with fewer than half of the physicians in specialties that are considered to be "primary care".

Public health departments experience difficulty in finding qualified professionals, such as public health physicians, and there are shortages of trained allied health professionals such as emergency medical technicians. In general, there is a marked variation in the distribution of health professionals throughout the state, in comparison to the population distribution.

3. Problems of cost, quality control, and appropriate use of resources

Health expenditures in the United States amounted to $737 per person in 1977, and represented 8.8 percent of the gross national product. On the basis of these figures, the total spent for health care in Michigan can be estimated at $5.8 billion. The state's budget for public health, mental health, and Medicaid alone is more than $1.5 billion for 1978-79.

Michigan has about 5,000 surplus hospital beds, whose cost is estimated at $100 million or more annually. Many persons use emergency facilities as their regular source of care, unnecessarily use expensive inpatient facilities, or seek specialty services in cases where primary care is appropriate. Within the health care system, increasing use of high-level technology has contributed to the costs of health care.

4. Lack of information to support decision-making

Lack of sufficient information contributes to many of Michigan's health problems. Prevalence of chronic illness and disability, disease investigation and surveillance, resource needs, prevalence of environmental contamination, and, in some cases, basic scientific knowledge, are examples of information needed to make decisions for health care planning and services.

5. Inadequate health knowledge

Underlying many of the health problems is the detrimental effect of inadequate health knowledge. Areas affected by inadequate health knowledge include prevention and control of disease, pregnancy and infant care, control of environmental problems, and use of health resources. Inadequate knowledge contributes to problems of behavior and life style which are detrimental to health.

DETAILED DOCUMENTATION

Priority Health Problems of Michigan, 1979-80

The following sections of this document provide detailed discussion of the health problems summarized in the previous section.

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HEALTH STATUS PROBLEMS

COMMUNICABLE DISEASE PROBLEMS

Over the years, incidence and mortality rates of several communicable diseases have fallen markedly due to immunization of children, development of outbreak containment methods, and improvement of sanitation and drugs. Nevertheless, Michigan continues to experience excessive rates of some communicable diseases such as hepatitis, measles, and salmonellosis, and threats of new diseases such as encephalitis and Legionnaire's disease. During 1978, there were more than 200,000 cases of the thirteen most commonly reported communicable diseases.

Some communicable diseases can be readily prevented by safe and effective vaccines. They are regarded as problems not only because of the frequency of illness, but also because so many children in the state lack the available protection.

Other communicable diseases are not so amenable to control or prevention. The venereal diseases remain a major and growing problem. Tuberculosis, although markedly reduced in the last two decades, remains a problem among some low-income groups, and health officials have stated that the known cases may be only a small part of the total. Acute respiratory diseases such as influenza and pneumonia are a significant cause of illness and death, although some prevention is possible through the use of influenza vaccines. From February through June, 1979, Reye's Syndrome, a disease thought to be associated with flu outbreaks, caused 57 cases of illness and 8 deaths among Michigan's children.

And finally, among the problems related to communicable disease, there are environmental factors that can cause or contribute to the risk of the disease, such as food or water-borne bacteria, insect or rodent carriers of disease, or substandard living conditions.

Diseases that Can be Prevented or Controlled Through Immunization

Frequency or Prevalence of the problem

Each of the approximately 140,000 infants born in Michigan each year are susceptible to the entire gamut of communicable diseases until they receive suitable inoculations of the appropriate vaccines and develop immunity. A susceptible child needs to receive one or more doses of each vaccine at certain optimal intervals, and some of these agents must also be administered as periodic, related (booster) doses as the child grows up. Thus the protection of our youth against communicable diseases is a continuing program, since a new crop of susceptibles is born yearly, and the renewal of immunization, though most intense during pre-school years, must be carried on throughout life to maintain a high level of protection.

In 1978, Michigan led the country in the number of cases of measles and rubella reported, and for measles, mumps, and rubella combined, there were more than 13,000 cases reported (Table 1). Although immunization services are universally available, apathy, rejection, lack of health knowledge, or poor accessibility contribute to the continuation of these disease problems.

Surveys conducted among children who were entering Michigan schools for the first time, and among a sampling of two-year-olds, have demonstrated that fewer than 90 percent of the children in each group have a complete immunization series, for each of the five immunizable diseases. In some cases, the percentage of children immunized was much lower--in 1977, 20 percent of the school enterers did not have a complete immunization series for polio, and 40 percent did not have immunization for mumps (Table 2). In 1977, 85 percent indicated immunization for measles, but this percentage dropped to 77 percent in a 1978-79 survey (Table 3). In 1978-79, only 69 percent of the school enterers had series for all of the five diseases complete. The survey of two-year-olds in 1977 indicates that immunization is often delayed beyond the crucial early years, with only 88 percent having completed the series for DPT (diptheria, pertussis, tetanus), measles, and rubella; and 79 and 80 percent having completed the series for polio and mumps, respectively. Susceptibility of children in poorer segments of the population is shown by findings of the screening program for children under Medicaid, where, in 1977, one-fourth of the children were found to need immunization (Table 4).

The potential number of cases of communicable diseases in the absence of immunization programs can be estimated by referring to data from previous years. In the first five years of the 1920's, 44,600 cases of diphtheria and 17,000 cases of smallpox occurred among Michigan residents. (Smallpox is now considered to be eradicated worldwide.) The late 1930's and early 1940's were severe years for whooping cough; there were 62,700 cases in the last five years of the 1930's. The early 1950's were the worst years for polio, with more than 11,900 cases reported in 1950-54. During the first five years of the 1960's there were more than 170,000 cases of measles in Michigan (Table 5).

Impact of the problem

The immunizable diseases result in pain, suffering, and disability, and in limitation of activity to varying degrees.

Diphtheria is infrequent in the United States, but is still a serious and troublesome disease. About 250 cases are reported each year in the U.S. and about 10 percent are fatal. Patients with diphtheria require hospitalization and complete isolation for two to three weeks. About 10 percent develop evidence of myocarditis, which is the most important cause of death. Other complications may include bleeding and paralysis.

Measles is a viral disease characterized by high fever, nasal congestion, eye inflammation, rash, and other symptoms. It produces significant illness and may result in secondary complications such as ear infection or pneumonia, or, infrequently, encephalitis. The measles virus can reactivate dormant tuberculosis, and has been associated with premature births and aborted fetuses.

The major illness from mumps occurs in school children, though adults develop more striking illnesses. Mumps causes fever and discomfort and requires isolation and bed rest. Encephalitis with convulsions and alteration of sensory functions can result. Ten to 20 percent of adolescent or older male patients experience testicular swelling; testicular atrophy may occur, and, in very rare cases, sterility. Diabetes mellitus may follow this disease, as well as other serious complications.

The impact of polio ranges from no apparent illness, to non-specific syndromes, to diseases of the nervous system which may result in paralysis. Paralytic polio causes severe pain, spasms, difficulty in breathing, and other severe problems which may result in death. Non-paralytic polio may require intensive treatment; paralytic polio requires intensive treatment, physiotherapy, and extended rehabilitation. Some patients may require respirator care throughout their lives. Chronic anxiety and depression are almost universal in severely damaged adults and are probably the result of the sudden impact of a crippling disease with its social and economic implications.

Rubella (German measles) is a viral disease which is generally mild clinically but carries a significant risk in the pregnant woman who contracts the disease in early pregnancy. Congenital rubella may result in mental retardation, cardiac defects, glaucoma, cataracts, or deafness.

Tetanus (lockjaw) is a severe and dreaded infectious complication of wounds causing convulsions and spasms and a high mortality rate of about 50 percent. Intensive hospital care and skilled nursing is required.

Whooping cough (pertussis) is an acute infection which affects children predominantly. It is highly contagious and dangerous for young infants, with approximately 70 percent of all deaths from whooping cough occurring in the first year of life.

Most of the immunizable diseases are highly contagious; mumps, for example, will infect 80 to 90 percent of susceptible individuals. With a disease such as smallpox, polio, or diphtheria, the occurrence of even a single case results in a complete public health investigation and follow-up by epidemiologists, with all contacts being isolated, tested, and treated if necessary.

Some of these diseases can have long-range effects, resulting in continuing high costs of care, work loss, and lost school days. Rubella in pregnant women can result in the birth of a person with mental and physical defects requiring lifelong care (See section on Mental Retardation and Related Developmental Disabilities). Victims of paralytic polio often need special facilities and devices, as well as ongoing therapy and counselling.

Community concern about the problem

Concern about these diseases is expressed by the immunization of children, indicating public awareness of the potential seriousness of these illnesses, as well as by media coverage of immunization programs and the possible harmful effects of lack of immunization. Vaccine preventable communicable diseases are included in state and Health Systems Agency (HSA) health plans as priority health problems for the state.

Numerous state laws have been enacted in this area, dating back to 1879 (Act 46, P.A. 1879, Vaccination Act). Current legislation covering immunization is included in the new Public Health Code (Act 368, Part 92). This legislation provides for free immunization clinics, and requires a certificate of immunization (or statement of exemption) upon school entry.

TABLE 1

NUMBER OF REPORTED CASES OF VACCINE-PREVENTABLE DISEASES

MICHIGAN AND THE UNITED STATES 1978

Disease	Number of cases reported		Percent of total reported by Michigan
	Michigan	United States	
Measles	8,006	26,795	29.9
Mumps	1,628	16,681	9.8
Rubella	3,373	17,772	19.0
Diptheria	0	75	0.0
Pertussis	45	1,999	2.3
Tetanus	1	82	1.2
Polio	0	4	0.0
All diseases	13,053	63,408	20.1

Source: Bureau of Disease Control and Laboratory Services, Division of Epidemiology, Michigan Department of Public Health

TABLE 2

NUMBER OF NEW SCHOOL ENTRANTS AND TWO-YEAR-OLDS SURVEYED, AND PERCENT WITH IMMUNIZATIONS COMPLETED, BY TYPE OF IMMUNIZATION

MICHIGAN 1977

Type of Immunization	School Entrants	Two-year-olds
Number surveyed	135,870	1,636
Percent with series completed[1]		
DPT	82.5	87.6
Polio	80.1	79.0
Measles	85.0	87.8
Rubella	84.1	87.8
Mumps	59.0	79.8

[1]DPT, Polio: at least 3. Measles, rubella, mumps: 1. Approximately 10 percent of the school entrants had no records available and were counted as unimmunized. Only two-year-olds with records were surveyed.

Source: Bureau of Disease Control and Laboratory Services, Michigan Department of Public Health.

TABLE 3

NUMBER OF NEW SCHOOL ENTRANTS, AND
PERCENT WITH IMMUNIZATIONS COMPLETED,
BY TYPE OF IMMUNIZATION[1]

MICHIGAN 1978-1979

Type of Immunization	Percent with No Immunization	Percent with Series Completed[2]
DPT	9	87
Polio	11	85
Measles	23	77
Rubella	18	82
Mumps	30	70
All types	Percent with one or more series not completed.	Percent with all series completed.
	31	69
Total number of new school entrants: 135,175 Percent with no report: 6.9 Percent with waiver: 0.5		

[1]As of November 1, 1978 Reports.

[2]DPT, Polio: at least 3.
Measles, rubella, mumps: 1.

Source: Bureau of Disease Control and Laboratory Services, Michigan Department of Public Health.

TABLE 4

NUMBER AND PERCENT OF CHILDREN NEEDING IMMUNIZATION AT TIME OF SCREENING, BY IMMUNIZATION TYPE AND AGE
EARLY AND PERIODIC SCREENING, DIAGNOSIS, AND TREATMENT PROGRAM

MICHIGAN 1977

Type of immunization needed	Number and percent of children needing immunization							
	All ages		0-12 months		13-60 months		Over 60 months	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total number screened	114,922	100	8,262	100	31,489	100	75,171	100
Diphtheria	18,529	16	2,774	34	8,080	26	7,675	10
Tetanus	18,510	16	2,771	34	8,077	26	7,662	10
Pertussis	13,488	12	2,766	33	7,997	25	2,725	4
Polio	18,816	16	2,773	34	8,223	26	7,820	10
Rubella	6,802	6	200	2	4,830	15	1,772	2
Rubeola	6,914	6	188	2	4,820	15	1,906	3
Mumps	8,454	7	190	2	5,026	16	3,238	4
Other	1,264	1	34	0	373	1	857	1
At Least One	25,965	23	2,976	35	10,554	34	12,495	17

This table displays the types of immunizations needed by age groups. Most screening clinics are providing immunizations at the time of screening if needed. This table includes all immunizations needed, including those given at the screening clinic. For example, out of 114,922 children screened, 16 percent (18,529 children) lacked adequate diphtheria immunization when they came in for screening.

TABLE 5

REPORTED CASES OF VACCINE PREVENTABLE DISEASE

MICHIGAN 1960 - 1978

Disease	Years			
	1960-64	1965-69	1970-74	1975-78
Measles	170,504	45,086	13,763	18,756
Mumps	66,971	58,110	34,574	19,335
Rubella (German measles)	24,902	21,575	10,856	7,737
Pertussis (Whooping cough)	5,891	2,944	641	283
Diphtheria	22	2	2	-
Poliomyelitis	170	9	3	1
Tetanus	33	26	25	6
Smallpox	(The last case of smallpox in Michigan was reported in 1947)			

Source: Bureau of Disease Control and Laboratory Services, Division of Epidemiology, Michigan Department of Public Health

Venereal Disease Problems

Frequency or prevalence of the problem

Venereal disease is the principal uncontrolled form of communicable disease in Michigan today. Gonorrhea, which had been escalating at an average annual rate of 10 percent from 1962 to 1972, appeared to be stabilizing in 1973-74. However, it now appears that the increasing trend has resumed (Table 6). Michigan gonorrhea cases are known to be grossly under-reported. Table 7 shows an estimate of the true incidence of this disease, approximately four times the number of reported cases. A decreasing trend in syphilis, which began in 1972, is attributed to the strengthening of control techniques. The Herpes-2 virus, recently recognized as a major problem, has caused venereal disease in an estimated 10 percent of all adult Americans.

The number of females developing pelvic inflammatory disease as a result of gonorrhea was estimated to be about 11,600 in 1976, with several thousand becoming sterile as a result. Syphilis causes many hospitalizations in Michigan each year, and causes about 10 deaths.

Genital herpes is not a reportable disease, but it is estimated that 10 percent of the adult men and women in the United States suffer from this ailment. Applying the same estimated prevalence to Michigan indicates that 500,000 adults may be affected. Other venereal diseases that are not reportable, but are becoming major health problems throughout the nation, are nongonococcal urethritis and trichomoniasis. Chlamydia infections are frequently the cause of nongonococcal urethritis and post-gonococcal urethritis and the venereal disease lymphogranuloma venereum. The estimated number of cases of nongonococcal urethritis in Michigan each year is 40,000.

In a federal study made in Detroit in 1977, an average of 25.1 per 100 men examined had nongonococcal urethritis. Herpes was detected at a rate equivalent to 1 for every 1,000 men examined. In women, 25.3 per 100 examined had trichomoniasis, but none were found to have herpes.

Impact of the problem

Gonorrhea can be treated on an outpatient basis. However, local complications of gonorrhea in both males and females may cause fever and illness, and, if severe, hospitalization and bed rest are required. Over 500 women with pelvic inflammatory disease required surgical procedures in 1976 (Table 8). A total of 63,900 hospital days in 1976 was attributed to women with complications of gonorrhea, and teenage females lost an estimated 12,000 school days.

Genital herpes causes extreme discomfort, with fever and swelling of the lymph glands. Although the infection lasts for only a week or two, it may recur throughout a person's life. The infections may be transmitted to the mouth or eyes, and can cause scarring of the cornea and even blindness.

Patients with early syphilis require treatment and testing for periods as long as a year or eighteen months, with repeated physician visits. The consequences of untreated syphilis can be extremely serious with symptoms

becoming latent and emerging again after 15 or 20 years. This disease can damage all major organs of the body.

The effect of nongonococcal urethritis in men is similar to that of gonorrhea, and in women, can cause sterility. Trichomoniasis does not have as serious consequences, but can cause great discomfort.

Venereal diseases can be transmitted to newborn infants. An untreated mother with early syphilis will almost always deliver an infected infant. The herpes virus is transmitted from the mother to the fetus during late pregnancy or delivery, and proves fatal to the infant 25 percent of the time. Of the surviving herpes babies, one-third, on the average, can be expected to develop serious medical problems. A gonorrhea infection in a newborn is regarded as a medical emergency, and infants must be isolated to prevent nursery epidemics.

Gonorrhea and syphilis are both reportable diseases. Because of the high probability of contagion, personnel of public health agencies interview infected patients and trace their contacts for follow-up and testing.

The venereal diseases require physician treatment and medication. Syphilis may require long-run intensive care; herpes may require periods of treatment throughout a person's life. When the diseases are passed on to infants, additional treatment and resources are required. Thus, a significant burden is placed upon the medical resources of a community.

These diseases primarily affect adults, and are responsible for lost work time, due to required treatment or incapacitating symptoms.

Community concern about the problem

The spread of venereal disease, principally gonorrhea, has been noted as a national problem. Genital herpes has received increasing attention with press coverage to alert the public to this problem. Venereal disease is included in state and Health Systems Agency (HSA) health plans as a priority health problem for the state.

Numerous state legislation has been enacted in this area, dating back to 1919 (Act 272, P.A. 1919, Basic Venereal Disease Control Act). Legislation concerning venereal disease is included in the new Public Health Code (Act 368, Part 52, Sections 5201-5269). This legislation provides for the reporting and treatment of all cases of venereal disease, venereal disease testing for applicants for marriage licenses, and preventive treatment for newborns.

TABLE 6

CHANGES IN REPORTED GONORRHEA MORBIDITY

MICHIGAN 1972-77

Fiscal Year	Gonorrhea Morbidity	Change
1972-73	27,522	+ 17%
1973-74	32,676	+ 19%
1974-75	31,724	- 3%
1975-76	33,655	+ 6%
1976-77	35,195	+ 5%

Source: Bureau of Disease Control and Laboratory Services, Michigan Department of Public Health.

TABLE 7

ESTIMATED NUMBER OF CASES OF GONORRHEA

MICHIGAN 1976

Males		
Clinic cases reported	15,710	
Private cases reported	4,264	
Private cases unreported (estimated)	31,255 (1)	
Estimated cases treated (symptomatic)		51,299
Estimated cases unreported and untreated (asymptomatic)		17,100 (2)
Total estimated male incidence		68,399
Females		
Total estimated female incidence		68,399 (3)
TOTAL ESTIMATED GONORRHEA INCIDENCE		136,798

(1) Based on national survey, Center for Disease Control, DHEW,
(2) Based on study carried out by Center for Disease Control, DHEW.
(3) Assumed equal to number of male infections.

Source: Bureau of Disease Control and Laboratory Service, Michigan Department of Public Health.

TABLE 8

ANALYSIS OF THE HEALTH AND ECONOMIC IMPACT
RESULTING FROM GONOCOCCAL PELVIC INFLAMMATORY
DISEASE (P.I.D.)

MICHIGAN 1976

True Incidence Estimate of Gonorrhea Infection in Females	68,399
Number of females infected with Gonorrhea who developed P.I.D. complications (17%)	11,628
Number of Females developing P.I.D. complications who required surgical sterilization procedures (4.5%)	523
Direct hospital and medical costs incurred as a result of P.I.D. infections (Average - $963 per patient)	$11,197,764
Hospitalized Days of Females with P.I.D. (Average 5.5 Days per patient)	63,954
Number of Females rendered sterile as a result of P.I.D. (15 to 40%)	1,744 to 4,651

Source: VD Fact Sheet
DHEW, PHS, Center for Disease Control

Tuberculosis

Frequency or prevalence of the problem

In 1977, there were 1,290 new cases of tuberculosis reported in Michigan, and an overall rate of 14.1 cases per 100,000 population. The City of Detroit accounted for 38.6 percent of the new cases and was ranked ninth among the 57 largest U.S. cities by rate (37.3 per 100,000 population). A large number of cases may be related to or complicated by other chronic problems -- for example, alcoholism.

In 1977, the new cases of tuberculosis in Michigan required the testing of nearly 12,000 contacts, and placing 1,280 of these on preventive treatment. At year's end, there were 4,464 cases under supervision by local health departments, 3,327 of which were receiving medication. There were 3,073 positive reactors receiving preventive treatment.

The Federal Center for Disease Control has stated that the 29,000 cases of tuberculosis reported in the U.S. in 1978 may be only a fraction of the actual number. It is estimated that there may be as many as 15 million persons with the disease who do not know they have it. Nationally, there are more deaths from TB than any acute infectious disease other than pneumonia. In 1977, there were 64 deaths in Michigan from pulmonary and respiratory tuberculosis.

Impact of the problem

Tuberculosis is a chronic bacterial disease. The primary infection may go unnoticed, but over a period of years the disease can progress to serious pulmonary and extrapulmonary involvement, leading to death in some cases. Prolonged household exposure to an active case usually leads to infection of contacts and frequently to active disease.

A person who is suspected of TB contact requires laboratory or X-ray tests. Early cases may need hospitalization. Preventive treatment may require medication for a year or more. Even in its non-symptomatic stage, tuberculosis is disruptive to normal activity and to family and other social contacts. Persons with this disease are barred from certain occupations, and must observe special precautions in their personal hygiene.

In the long run, pulmonary tuberculosis has a chronic, variable course, with exacerbations and remissions, and is capable of arrest or relapse at any stage. Problems caused by the disease, especially in the advanced stage, are cough, fatigue, fever, weight loss, chest pain, and hemoptysis.

Control of tuberculosis requires medical, laboratory and X-ray facilities for examination of patients, contacts, and suspected contacts, and for early treatment; and beds for those needing hospitalization. Public health nursing

service is required for home supervision of patients and to monitor contacts. Preventive treatment, indicated for household contacts or other populations at high risk, requires medication for a year or more.

In former years, when tuberculosis was more prevalent, mass voluntary screening of the population of the state was carried out. Although the need for mass screening has declined, X-ray examination or testing for tuberculosis is still included in most screening programs, and for hospital patients.

Community concern about the problem

The closing of specialized tuberculosis hospitals has led to a nationwide perception that tuberculosis is no longer a problem. Since most patients are now treated at home, the disease does not seem to be as severe. People are often unaware that tuberculosis is occurring in their community.

For certain segments of the population, however, tuberculosis is still of concern. Those who are especially susceptible are: undernourished, neglected or fatigued persons, those with silicosis or diabetes, and alcoholics. It is recognized that tuberculosis is related to such social conditions as overcrowding and poverty, and concern about tuberculosis has been part of a more general concern about living conditions that are detrimental to health.

Current legislation covering tuberculosis is included in the new Public Health Code (Act 368, Part 52, Sections 5201-5269). This legislation provides for the reporting and treatment of all cases of tuberculosis and other hazardous communicable disease.

Communicable Disease Hazards due to Environmental Factors

Many of Michigan's residents are subject to special risk of communicable diseases of all types because of the environments in which they live. Problems include exposure to water-borne and food-borne communicable disease, exposure to hospital-acquired infections, insects and rodents which carry disease, and overall substandard housing conditions. These hazards are discussed more fully in the section of this report on environmental health problems. (The following summary relates only to communicable disease hazards in the environment. The sections of the report on contamination of food and water supplies, and on problems related to housing and other living conditions, contain a more complete discussion of these environmental problems.)

Frequency or prevalence of the problem

Virtually all of the population of Michigan is exposed to some degree to environmental factors which can spread communicable disease. Though serious water-borne diseases such as cholera and typhoid are no longer prevalent in Michigan, exposure to diseases such as infant diarrhea and infectious hepatitis still occurs.

Food-borne disease, in the form of microbial infection, is one of the most common forms of non-fatal illness in Michigan. Though the actual incidence is unknown, the state can be estimated to have 270,000 cases of gastroenteritis annually, based on the 5 to 10 million cases that occur each year in the United States. Within recent years, large numbers of cases of gastroenteritis and related illnesses have been reported in Michigan, with several cases of infants who became seriously ill.

Rats are a problem in many communities, and are potential carriers of rat bite fever, leptospirosis, salmonellosis, and other diseases, and probably account for at least part of the 1,155 cases of salmonellosis reported in 1978. Other diseases are transmitted by flies, cockroaches, lice, mites, or mosquitos.

Certain living environments create hazards because of poor sanitation, coupled with crowded conditions where diseases can spread rapidly. These environments include not only rural and urban substandard housing, but also many of the campgrounds, mobile home parks, and substandard agricultural labor camps, where Michigan residents and visitors either live or spend part of their vacations. During 1978, about 40 mobile home parks did not meet minimum health and safety standards. There were 45 campgrounds which presented similar health hazards, with the hazard increased because of sharing of common facilities.

A large number of hospital-acquired infections are occurring that result in unnecessary illness. Nationally, it is estimated that approximately 5 percent

of short-term hospital admissions to civilian facilities develop one or more nosocomial infections (1975 data). All hospitalized persons are at some risk, with a particularly high risk for those who are debilitated or are taking immunosuppression drugs.

Impact of the problem

The impact of many of the communicable diseases has been described in previous sections. These diseases, as noted, can have serious consequences.

Many of the diseases, such as some of the food-borne and water-borne illnesses, are probably widely prevalent in mild form -- the effects range from inconvenience, discomfort and suffering to true medical emergencies. Serious cases cause nausea, cramps, vomiting, diarrhea and prostration, but even minor illness interferes with work, school, and daily activities. Among the food-borne or water-borne diseases with significant impact are infant diarrhea, which can be fatal in newborn infants; infectious hepatitis, which can be severely disabling; botulism; and gastroenteritis.

Persons living in substandard housing environments have increased exposure to communicable disease, thus suffering a general impact of illness, medical expenses, and work loss. In areas of extensive substandard housing, the frequent occurrence of communicable disease may require the maintenance of added medical care resources, that would not be necessary if living conditions were less hazardous. Another impact on the community is contamination of food and water supplies by insects and rodents that are disease carriers.

Epidemiologic follow-up of outbreaks of food-borne and water-borne disease is a major cost associated with this problem, involving examination of patients, laboratory analysis of specimens, and a study of the environment to determine the cause of contamination. The potential costs, in the absence of effective control, are very high.

The consequences of hospital-acquired infections include premature deaths, extended hospital stays and other increased medical costs, permanent disabilities, repetitive operations, loss of income and productivity, and the spread of drug-resistant organisms in the community.

Community concern about the problem

There is intense concern about contamination of food and water supplies, and living environments, with disease-causing substances. In recent years, most concern has focused on toxic chemical contamination, and the problem of environmental-related communicable disease is considered as part of the overall environmental problem. Media coverage, including newspaper articles and television programs, has been especially extensive. Environmental contamination is listed as a priority health problem in both state and Health Systems Agency (HSA) health plans.

Entensive state and federal legislation has been passed in the area of environmental health and protection. Federal legislation includes the Federal Water Pollution Control Act (P.L. 92-500) and the Safe Water Drinking Act (P.L. 93-523). State legislation concerning safe water supplies dates back to 1913. Current legislation concerning food, water supplies, and living environments is contained in the new Public Health Code (Act 368, Parts 122-129). This legislation provides for regulation and inspection of water supplies, regulation of food service establishments and investigation of cases of food-borne diseases, minimum standards for housing, and regulation of recreational areas and labor camps.

CHRONIC ILLNESS

In recent decades, with many infectious diseases coming under control, chronic illnesses have become the leading causes of death in Michigan (Figure 9 and Table 10). Heart disease, cancer, and cerebrovascular disease (stroke) are now the three leading causes of death, both in Michigan and in the United States as a whole, and account for more than 68 percent of all deaths in the state (Table 11). These three diseases are also frequently listed as contributing causes of death, and, along with diabetes, arthritis, renal disease, and other chronic illnesses, cause widespread suffering and disability. They are also expensive both in terms of direct medical costs and in terms of work loss and family disruption.

Many people, particularly among the elderly, have more than one chronic condition. According to the National Health Interview Survey, only 14 percent of the noninstitutionalized people 65 years of age and older have no chronic disease that they are aware of. For the increasing aged population, longer life expectancy may mean years of chronic and disabling illness. For arthritis and heart conditions, the prevalence rate increases with age (Table 12). The prevalence rate for arthritis and hypertensive disease is higher for females than for males, for those over 17 years of age.

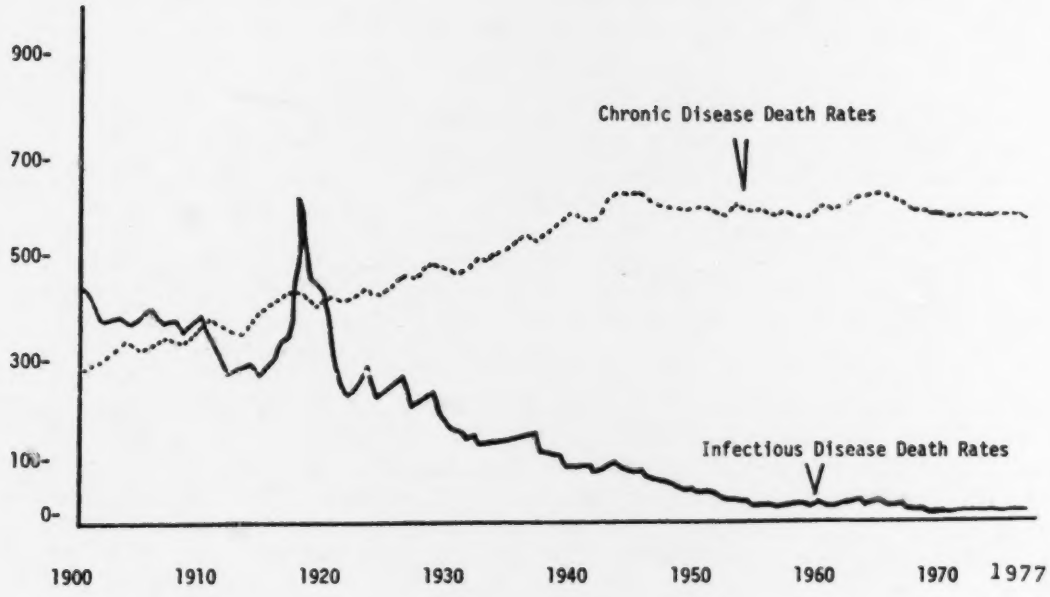
Chronic conditions often require hospitalization, and cause limitations of activity ranging from moderate to total disability (Tables 13 and 14). In 1977, $153 million was spent by state health agencies on the operation of chronic disease hospitals, with a total of $210 million spent on programs primarily for chronic disease. The average charge per admission for chronic illnesses for Medicare enrollees in 1973 ranged from 916 dollars to 2,254 dollars, and the average charge per day ranged from 84 to 119 dollars (Table 15).

Many of the chronic conditions not only affect the individual but also place emotional and financial burdens on the family. The community is affected by the cumulative costs of individual medical care and work loss as well as by the high cost of providing medical facilities, equipment, and staff, and supporting individuals who are permanently disabled by chronic disease.

FIGURE 9

DEATH RATES DUE TO SPECIFIC CHRONIC AND INFECTIOUS DISEASES

MICHIGAN 1900 - 1977



Rate Per 100,000 Population

Includes following diseases indicated by International Class. Eighth Revision Detailed List Numbers in parenthesis: Chronic Disease: - Cancer (140-209), Diabetes (250), Vascular lesions affecting central nervous system (430-438), Diseases of heart (390-398, 402, 404, 410-429), Chronic and unspecified nephritis (582-584), Ulcer of stomach or duodenum (531-532), Cirrhosis of Liver (571). Infectious Diseases - Typhoid fever (001), Scarlet Fever (034.1), Whooping cough (033), Diphtheria (032), Tuberculosis (101-019), Dysentery (004, 006, 007), Malaria (084), Syphilis (90-97), Measles (055), Pneumonia and Influenza (470-474, 480-486), Diarrhea, enteritis and ulceration of intestines (535, 563, 008, 009).

Source: Health in Michigan: A Profile, 1973-1974, Michigan Department of Public Health, Center for Health Statistics, Updated.

TABLE 10

DEATH RATES FROM NON-INFECTIOUS DISEASES, MICHIGAN RESIDENTS, 1900-1977

Cause of death	Death rate per 100,000						
	1900-04	1920-24	1940-44	1950-54	1960-64	1970-74	1977
Malignant neoplasms	62.8	89.1	126.4	140.7	147.6	154.6	165.7
Diabetes mellitus	10.7	15.9	27.1	21.0	24.1	23.4	17.7
Disease of the heart	135.0	174.5	304.1	321.4	353.3	331.5	316.5
Arteriosclerosis	-	-	18.3	18.9	18.8	13.0	12.8
Cerebrovascular disease	89.1	105.1	90.8	100.0	98.8	86.0	74.7

Source: Michigan Health Statistics: Annual Statistical Report 1975, Office of Vital and Health Statistics, Michigan Department of Public Health, Updated.

TABLE 11

LEADING CAUSES OF DEATH

NUMBER OF DEATHS AND CAUSE - SPECIFIC DEATH RATES,
MICHIGAN AND UNITED STATES RESIDENTS 1977

Rank	Cause of Death	Number of Deaths		Death Rate[2]	
		Michigan	U.S.[1]	Michigan	U.S.[1]
1	Diseases of the Heart	28,895	713,640	316.5	331.6
2	Malignant Neoplasms	15,125	384,000	165.7	178.4
3	Cerebrovascular Diseases	6,818	181,580	74.7	84.4
4	Accidents	3,945	100,700	43.2	46.8
5	Influenza and Pneumonia	1,660	49,630	18.2	23.1
6	Diabetes Mellitus	1,615	33,340	17.7	15.5
7	Cirrhosis of the Liver	1,356	31,050	14.9	14.4
8	Suicide	1,280	26,970	14.0	12.5
9	Arteriosclerosis	1,164	28,840	12.8	13.4
10	Homicide	946	19,470	10.4	9.0
	Sub Total	62,803	1,569,220	688.0	729.1
	All Other Causes	11,341	319,290	124.2	148.4
	Total	74,144	1,888,510	812.2	877.5

[1]United States figures are provisional.

[2]Rate per 100,000 population.

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

TABLE 12

PERCENT OF PERSONS LIMITED IN ACTIVITY DUE TO CHRONIC CONDITIONS, BY SEX AND AGE, ACCORDING TO TYPE OF CONDITION

UNITED STATES 1976

Activity limitation, sex, and age	Chronic condition									
	Arthritis and rheumatism	Heart conditions	Hypertension without heart involvement	Diabetes	Mental and nervous conditions	Asthma	Impairments of back or spine	Impairments of lower extremities and hips	Visual impairments	Hearing impairments
All degrees of activity limitation[1]	Percent of persons limited in activity because of specified condition									
Both sexes, all ages	16.8	15.7	6.9	5.1	4.9	4.8	7.5	6.1	5.4	2.5
Under 17 years	*1.0	2.4	*0.3	*1.0	6.7	20.1	3.2	6.9	3.7	5.2
17–44 years	6.8	4.8	3.4	2.3	5.9	5.9	13.9	8.0	4.2	2.7
45–64 years	19.6	19.0	9.0	6.8	5.7	3.4	7.9	5.6	4.0	1.9
65 years and over	24.9	23.4	8.9	6.3	3.0	2.1	3.3	5.0	8.2	2.4
Male, all ages	11.4	16.7	4.8	4.8	4.4	4.9	7.2	6.7	5.7	2.8
Under 17 years	*0.4	*2.5	*0.4	*1.1	8.1	21.2	*1.5	7.4	3.8	5.2
17–44 years	4.9	3.9	2.4	1.8	5.5	5.3	13.3	10.2	5.7	3.2
45–64 years	14.9	22.2	6.8	6.9	4.7	2.7	8.0	6.3	4.8	2.6
65 years and over	16.3	25.3	6.1	6.2	2.0	2.2	2.7	4.0	7.6	2.0
Female, all ages	21.7	14.8	8.9	5.2	5.4	4.8	7.9	5.5	5.0	2.2
Under 17 years	*1.9	*2.2	*0.2	*0.9	5.0	18.6	5.4	6.2	3.6	5.1
17–44 years	8.8	5.7	4.5	2.7	6.3	6.5	14.5	5.8	2.6	2.1
45–64 years	24.2	15.9	11.1	6.7	6.6	4.0	7.9	4.9	3.2	1.2
65 years and over	31.6	22.0	11.1	6.4	3.8	2.0	3.8	5.7	8.6	2.7

1 Includes those limited but not in major activity, limited in amount or kind of major activity, and unable to carry on major activity.

Source: "Health*United States, 1978," DHEW Publ. No. (PHS) 78-1232. Data from the National Health Interview Survey.

TABLE 13

ESTIMATED NUMBER AND RATE OF DISCHARGES AND AVERAGE LENGTH OF STAY FOR PATIENTS DISCHARGED FROM SHORT STAY HOSPITALS, BY SELECTED DIAGNOSTIC CATEGORIES

MICHIGAN 1976[1]

Diagnostic Category	Estimated Number of Discharges	Rate of Discharges Per 1,000 population	Average Length of Stay in Days
Ischemic Heart Disease	83,757	9.2	10.7
Acute myocardial infarction	17,298	1.9	14.3
Chronic ischemic heart disease	54,624	6.0	10.2
Other ischemic heart disease	10,925	1.2	8.0
Malignant Neoplasms	70,101	7.7	12.7
Diseases of the Urinary System	50,072	5.5	7.0
Cerebrovascular Disease	27,312	3.0	13.2
Diabetes Mellitus	23,670	2.6	10.4
Alcoholism	18,208	2.0	8.1
Osteoarthritis and Allied Conditions	104,696	11.5	11.4
Other Arthritis and Rheumatism	120,173	13.2	9.7

[1]Rate of discharge per 1000 population, and average length of stay, are based on U.S. data. Estimated number of discharges in Michigan is based on U.S. rates.
Source of the U.S. data: Utilization of Short-Stay Hospitals, Vital and Health Statistics: Series 13, No. 37, DHEW Pub. No. (PHS) 78-1788.

TABLE 14

ESTIMATED PERCENT OF POPULATION WITH LIMITATIONS OF ACTIVITY DUE TO CHRONIC CONDITIONS, BY AGE, SEX, AND RACE, ACCORDING TO DEGREE OF LIMITATION

MICHIGAN 1974-1976

Age, Sex, Race	Population (000's)	Percent By Degree of Limitation			
		Percent Not Limited in Activity	Percent Limited in Activity		
			All Degrees of Limitation	Limited in amount or kind of major activity	Unable to carry on major activity
Total	9,003	86	14	6	3
Age					
Under 45 years	6,453	93	7	4	1
45-64 years	1,774	75	25	14	5
65 years and over	776	55	45	23	15
Sex					
Male	4,343	86	14	6	5
Female	4,660	86	14	10	1
Race					
White	7,967	86	14	8	3
All other	1,036	87	13	7	4

Source: "State Estimates of Disability and Utilization of Medical Services: United States 1974-1976," DHEW Pub. No. (PHS) 78-1241.

TABLE 15

AVERAGE TOTAL CHARGE AND AVERAGE CHARGE PER DAY FROM SHORT STAY HOSPITALS FOR MEDICARE ENROLLEES, BY SELECTED DIAGNOSIS

UNITED STATES 1973

Diagnostic Category	Mean Charge per Discharge			Mean Charge per Day		
	All Discharges	With Surgery	Without Surgery	All Discharges	With Surgery	Without Surgery
	$					
Malignant neoplasm:						
Large intestine	2,254	2,810	1,368	119	128	96
Bronchus and lung	1,666	2,259	1,277	114	133	98
Breast	1,432	1,428	1,438	103	109	95
Prostate	1,309	1,481	1,068	102	113	86
Diabetes mellitus	1,138	2,212	971	90	104	86
Acute myocardial infarct.	1,718	3,167	1,649	117	161	114
Ischemic heart disease:						
Chronic	1,192	2,456	1,087	103	145	97
Other	999	2,442	945	105	140	103
Congestive heart failure	1,238	2,823	1,155	105	136	102
Cerebrovascular disease:						
Acute	1,375	2,706	1,311	90	114	88
Generalized ischemic	916	1,812	861	84	109	82
Arteriosclerosis	1,130	2,322	857	94	130	81
Infections of kidney	992	1,687	863	90	113	84
Osteoarthritis	1,426	2,652	872	106	131	84

Source: "Medicare: Inpatient Utilization of Short-stay Hospitals, by Diagnosis, 1973" Research and Statistics Note, No. 3, DHEW, June 1978.

Health Related Behavior and Living Conditions Linked with Chronic Illness

Many persons have increased susceptibility to major chronic diseases because of individual behavior and lifestyle. Smoking, lack of exercise, and improper diet all contribute to chronic illness. Alcohol and drug dependence contribute to premature death and disability. Alcoholism is a direct cause of death due to cirrhosis of the liver and a contributing factor in other chronic diseases. (See section on Alcohol and Drug Dependency in Other Health Status Problems for a complete discussion of this area.)

Environmental factors are also significant in the development of chronic disease. These factors include inadvertant and deliberate pollution of the environment, as well as stresses with poverty and unsafe working conditions. (See section on Environmental Health Problems for a complete discussion of this area.) There is some evidence that a stressful lifestyle is associated with hypertension, either as a cause of the disease, or as an unfavorable impact once the disease has begun. Stress may be a factor in the high incidence of hypertension among people in lower economic groups.

Frequency or prevalence of the problem

Although there has been a decline in the proportion of adults who are regular smokers, the number of women in certain age groups who are smokers has increased (Table 16) and the number of regular smokers between the ages of 12 and 18 has also increased (Table 17). In 1975 in the United States, regular smoking was part of the behavioral pattern for 40 percent of adult men and 29 percent of adult women. In 1974 16 percent of all boys between the ages of 12 and 18 and 15 percent of all girls were regular smokers.

At every age, and for both sexes, death rates are higher for people who smoke or who have smoked regularly in the past, than for those who have not smoked regularly. Diseases associated with smoking include chronic bronchitis, emphysema, and lung cancer, and smoking has also been associated with low birth-weight of infants. There is no question that cigarette smoking decreases longevity.

According to estimates based on actual triceps skinfold measurements in the National Health and Nutrition Examination Survey 13 percent of all men and 23 percent of all women between the ages of 20 and 74 could be classified as obese. Thus it can be estimated that more than 600,000 women, and 300,000 men in Michigan are obese (Table 18). According to self-assessed weight status, 30 percent of all adult men, and about half of all adult women, see themselves as overweight (Table 21).

There is uncertainty about the causes of obesity, or about effective methods of weight control. Obese people are more prone to develop gall bladder disease, strokes, diabetes, heart disease, and hypertension. Both the prevalence and incidence of hypertension increase as weight increases, and the greater the weight gain, regardless of initial weight, the greater the tendency to high blood pressure. Data also show that if overweight people reduce, their blood pressure goes down.

Regular exercise is a means of ensuring good health and is particularly important for maintaining the cardiovascular system. In 1975 less than 50 percent of the population engaged in regular exercise, with this proportion dropping to 39 percent for women 65 years of age and over (Table 22). The most frequent type of exercise was walking, reported by 34 percent of the population.

Impact of the problem

The impact on the individual of obesity, smoking, lack of exercise and other behavioral factors is an increased risk of chronic illness, with subsequent pain, disability, and premature death. Alcoholism is often a direct cause of death due to cirrhosis of the liver, while smoking increases the likelihood of death or disability due to lung disease. Obesity results in increased risk of heart disease and hypertension. The impact on the individual and the community of an unhealthy environment is also an increased risk of chronic illness, particularly a risk of cancer caused by toxic substances in the environment or the workplace.

For individuals, smoking reduces the chance of survival for heart and renal disease patients, as well as increasing the risk of death due to respiratory diseases. In 1974 current and former smokers reported more restricted activity days and work-loss days per person than persons who had never smoked (Table 19).

Nationwide, the cost of lost production due to illnesses related to smoking is estimated to be almost 20 billion dollars a year. The cost of medical care for these problems is more than 8 billion dollars annually.

Community concern about the problem

Community concern about behavior and lifestyle factors affecting health is frequently expressed through articles in the press, other media coverage, health care programs, and a general interest in preventive care and health maintenance.

Community concern about smoking is shown by public interest groups such as the Michigan Lung Association, which has mounted an extensive anti-smoking campaign, individual participation in smoking withdrawal clinics, and state and federal legislation. State legislation has been passed setting aside non-smoking areas in restaurants and other public buildings, and the federal government has issued reports and passed legislation on the harmful effects of smoking, such as the ban on television advertising for cigarettes and the warning labels required on cigarette packages. Concern about the health effects of smoking for individuals is shown by the fact that 32 percent of the hypertensive population and 29 percent of the non-hypertensive population who were advised to stop smoking actually quit (Table 20).

Concern about obesity is expressed through extensive media coverage, such as the wide range of diets currently publicized and participation in weight loss clinics and groups such as Weight Watchers.

Community concern about physical fitness and the effects of inadequate exercise on health status is expressed through newspaper articles, inclusion of physical fitness in state and HSA health plans, increased individual involvement in exercise programs, and the development of organized physical fitness programs in schools and in the community. In 1974, 49 percent of the population reported exercising on a regular basis (Table 22).

TABLE 16

CURRENT CIGARETTE SMOKING AMONG PERSONS 21 YEARS OF AGE AND OVER, ACCORDING TO SEX AND AGE

UNITED STATES 1964-66, 1970, and 1975

(Data are based on household interviews and telephone interviews of samples of the noninstitutionalized population resident in private households.)

Sex and age	1964-66	1970	1975
	Percent in age group who are current cigarette smokers		
Male			
All ages 21 years and over	52.4	42.2	39.3
21-24 years	64.3	49.8	41.3
25-34 years	59.9	46.7	43.9
35-44 years	59.9	48.6	47.1
45-54 years	53.5	43.1	41.1
55-64 years	49.2	37.4	33.7
65 years and over	28.8	22.8	24.2
Female			
All ages 21 years and over	32.5	30.5	28.9
21-24 years	45.2	32.3	34.0
25-34 years	42.6	40.3	35.4
35-44 years	39.9	38.8	36.4
45-54 years	39.9	36.1	32.8
55-64 years	20.5	24.2	25.9
65 years and over	7.7	10.2	10.2

NOTE: A current smoker is a person who has smoked at least 100 cigarettes and who now smokes cigarettes on a regular basis at least weekly.

SOURCES: National Clearinghouse for Smoking and Health, Center for Disease Control: Adult Use of Tobacco, 1970, DHEW Pub. No. (HSM) 73-8727, Health Services and Mental Health Administration, Atlanta, Ga., June 1973; Center for Disease Control and National Institutes of Health: Adult Use of Tobacco, 1975, Public Health Service, Atlanta, Ga., June 1976.

TABLE 17

CURRENT CIGARETTE SMOKING AMONG PERSONS 12-18 YEARS OF AGE ACCORDING TO SEX AND AGE

UNITED STATES SELECTED YEARS 1968-74

(Data based on telephone interviews of samples of the noninstitutionalized population resident in private households with telephones.)

Sex and age	1968	1970	1972	1974
Male	Percent in age group who are current cigarette smokers			
All ages 12-18 years	14.7	18.5	15.7	15.8
12-14 years	2.9	5.7	4.6	4.2
15-16 years	17.0	19.5	17.8	18.1
17-18 years	30.2	37.3	30.2	31.0
Female				
All ages 12-18 years	8.4	11.9	13.3	15.3
12-14 years	0.6	3.0	2.8	4.9
15-16 years	9.6	14.4	16.3	20.2
17-18 years	18.6	22.8	25.3	25.9

NOTE: A current smoker is a person who has smoked at least 100 cigarettes and who now smokes cigarettes on a regular basis at least weekly.

SOURCES: Regional Medical Programs Services, National Clearinghouse for Smoking and Health: Teenage Smoking, National Patterns of Cigarette Smoking Ages 12 Through 18, in 1968 and 1970, DHEW Pub. No. (HSM) 72-7508, Health Services and Mental Health Administration, Rockville, Md.; National Institutes of Health: Teenage Smoking, National Patterns of Cigarette Smoking, Ages 12 Through 18, in 1972 and 1974, DHEW Pub. No. (NIH) 76-931, Public Health Service, Bethesda, Md.

TABLE 18

ESTIMATED NUMBER AND PERCENT OF MICHIGAN POPULATION AGED 20-74 CLASSIFIED AS OBESE, ACCORDING TO SEX AND AGE

Number and Percent of Population Classified as Obese	MALE			FEMALE		
	TOTAL	20-44 Years	45-74 Years	Total	20-44 Years	45-74 Years
Number	333,514	200,926	132,588	604,972	279,592	325,380
Percent	13.0	14.0	11.8	22.7	19.1	26.9

Source: Data from the Health and Nutrition Examination Survey, in Health, United States 1976-1977, DHEW Pub. No. (HRA) 77-1232.

TABLE 19

SELECTED MEASURES OF HEALTH, ACCORDING TO SMOKING STATUS

UNITED STATES 1974

Health Measures	Smoking Status		
	Never Smoked	Former Smoker	Current Smoker
Disability			
Restricted activity days per person per year	19.3	21.8	20.2
Bed days per person per year	7.5	7.3	7.3
Work-loss days per person per year	4.0	4.7	5.3
Reported Conditions			
Percent with chronic conditions causing limitation of activity	18.9	22.4	17.3
Number reporting physician diagnosis of heart trouble per 1,000 persons	94.3	129.2	77.8

Source: Health, United States 1976-1977, DHEW Pub. No. (HRA) 77-1232

TABLE 20

SMOKING CESSATION AND PHYSICIANS' ADVICE BY HYPERTENSION STATUS, SEX, AND RACE

UNITED STATES 1974

Hypertension status, sex, and race	Percent of persons who have ever smoked who were advised to stop	Percent of persons advised to stop smoking who actually stopped smoking	Percent of persons not advised to stop smoking who stopped smoking
	Percent		
HYPERTENSIVE			
Total	34.0	31.8	43.0
Sex			
Male	35.3	39.9	50.1
Female	32.6	22.1	35.4
Race			
White	35.4	33.3	46.8
Black	26.9	19.4	22.7
NOT HYPERTENSIVE			
Total	21.1	28.7	33.1
Sex			
Male	20.4	35.1	36.5
Female	22.1	20.6	28.3
Race			
White	21.9	29.1	34.9
Black	14.4	20.7	16.6

SOURCE: Health Interview Statistics, National Center for Health Statistics.

TABLE 21

SELF-ASSESSED WEIGHT STATUS AMONG PERSONS 17 YEARS OF AGE AND OVER, ACCORDING TO SEX AND AGE

UNITED STATES 1974

(Data are based on household interviews of a sample of the civilian non-institutionalized population)

Sex and age	Self-assessed weight status				
	Total	Under-weight	About right	Over-weight	No rating
	Percent distribution				
Male					
All ages 17 years and over	100.0	9.6	51.0	30.5	8.9
17-44 years	100.0	10.8	50.9	28.1	10.2
45-64 years	100.0	6.2	49.9	37.9	8.9
65 years and over	100.0	12.1	60.7	23.8	3.3
Female					
All ages 17 years and over	100.0	6.2	41.9	48.9	3.1
17-44 years	100.0	6.0	42.5	48.4	3.1
45-64 years	100.0	4.6	36.0	56.1	3.3
65 years and over	100.0	9.6	51.1	36.9	2.4

SOURCE: Division of Health Interview Statistics, National Center for Health Statistics: Data from the Health Interview Survey.

TABLE 22

PERSONS EXERCISING REGULARLY AND TYPE OF EXERCISE, ACCORDING TO SEX AND AGE

UNITED STATES 1975

(Data are based on household interviews of a sample of the civilian non-institutionalized population.)

Sex and age	Civilian noninstitutionalized population in thousands	Percent exercising regularly[1]	Type of exercise						
			Ride bicycle	Do calisthenics	Jog	Lift weights	Swim	Walk	All other
Both sexes			Percent of population engaging in specific type of exercise						
All ages 20 years and over	135,655	48.6	10.9	13.5	4.8	3.4	11.8	33.8	6.8
20-44 years	71,084	53.7	16.1	17.3	7.3	5.4	16.9	33.8	6.9
45-64 years	43,145	43.4	6.5	10.8	2.7	1.5	8.0	32.9	6.5
65 years and over	21,426	42.3	2.9	6.1	1.2	*	2.8	35.7	6.9
Male									
All ages 20 years and over	63,665	48.5	10.8	13.5	7.2	6.3	13.3	32.5	6.4
20-44 years	34,268	52.7	14.9	17.5	10.6	10.1	18.8	31.4	6.2
45-64 years	20,567	42.0	6.7	10.1	3.8	2.6	8.1	31.4	5.9
65 years and over	8,830	47.3	4.3	5.9	2.1	*	4.1	39.4	8.1
Female									
All ages 20 years and over	71,990	48.7	11.1	13.5	2.7	0.8	10.5	35.0	7.1
20-44 years	36,816	54.6	17.2	17.1	4.1	1.1	15.0	36.0	7.5
45-64 years	22,579	44.6	6.4	11.4	1.6	*	7.8	34.2	7.1
65 years and over	12,595	38.7	1.8	6.3	*	*	1.9	33.0	6.0

[1] Regular exercise is defined as any exercise on a weekly basis.

NOTE: More than one type of exercise can be reported per person.

SOURCE: Division of Health Interview Statistics, National Center for Health Statistics: Provisional data from the Health Interview Survey.

Cardiovascular Disease

Frequency or prevalence of the problem

More than 36,000 people die in Michigan each year of some malfunction of the heart or blood vessels, and this represents 50 percent of all deaths in the state. Both in Michigan and nationwide, heart disease is the leading cause of death. Heart disease death rates increased sharply from 1900 to 1970, but appear to be declining slightly since then (Figure 23).

Blood pressure is the best single predictor of cardiovascular disease. There are an estimated 975,000 adults in Michigan with hypertension (high blood pressure). State health experts estimate that only 30 percent have their blood pressure under control, through medication or therapeutic measures[2].

Prevalence rates are not as high for whites as for other races, but increase for each group with increasing age (Table 24).

Impact of the problem

Heart disease causes death, disability, and suffering. Congenital cardiovascular disease requires long-term follow-up and rehabilitation, as well as restrictions in activity. Hypertension may require lifelong treatment with medication, often involving side effects, and medical monitoring. Untreated hypertension results in increased risk of heart disease and stroke, and causes rapid worsening of renal disease.

Patients hospitalized for heart disease in 1976 had an average length of stay of 10.7 days (Table 13). Frequently, this hospitalization includes one or more days in a cardiac care unit, which may cost several hundred dollars a day. The average charge per admission for Medicare patients hospitalized for heart disease in 1973 was over $1,200 (Table 15); with an annual inflation rate for hospital expenditures of more than 12 percent for 1977, the current charges are considerably higher. In 1976 15.7 percent of the U.S. population were estimated to have some degree of activity limitation due to heart disease. For Michigan, this would be approximately 1.4 million people.

In 1977, 71 hospitals in the state were equipped with a cardiac care unit, with a total of 450 beds, and 19 hospitals were equipped and staffed for open heart surgery.

Community concern about the problem

Community concern about heart disease is expressed in extensive press coverage and an increasing emphasis on exercise programs and dietary changes to reduce the risk of heart disease. Many individuals are participating in

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[2]Estimate is based on the control criterion of blood pressure less than 140/90.

hypertension screening programs. The Michigan Heart Association is a community group focusing on prevention of heart disease. Both heart disease and hypertension are included as priority health problems in the state and Health Systems Agency (HSA) health plans.

Cardiovascular diseases are included in the new Public Health Code (Act 368, Part 54, Sections 5401-5439). This legislation provides for a chronic disease prevention and control program, including treatment and rehabilitation for those with heart disease and hypertension.

FIGURE 23

HEART DISEASE DEATH RATES

MICHIGAN AND UNITED STATES RESIDENTS [1] 1900-1977[2]

[1]National rates are from death registration states for 1900-1932 and the United States for 1933-1977.

[2]Heart Disease death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration.

TABLE 24

ESTIMATED NUMBER OF MICHIGAN RESIDENTS AGE 18-74 WITH DEFINITE HYPERTENSION, AND PREVALENCE RATES, BY SEX, RACE AND AGE

MICHIGAN 1976

Sex and Age	Race			
	White		Black	
	Rate[1]	Number	Rate[1]	Number
Female				
Total	-	372,921	-	89,515
18-24	1.4	4,626	2.9	1,633
25-34	3.7	20,556	10.2	9,494
35-44	10.1	36,148	28.3	13,154
45-54	18.9	86,613	50.9	27,643
55-64	31.7	123,863	54.5	23,518
65-74	42.3	101,115	58.8	14,073
Male				
Total	-	429,416	-	86,755
18-24	4.9	14,908	4.6	2,097
25-34	8.2	43,026	17.7	14,343
35-44	17.3	71,628	38.2	18,672
45-54	25.8	117,336	36.8	19,846
55-64	31.1	113,069	49.9	21,209
65-74	35.3	69,449	50.1	10,588

[1]Rate per 100 persons, based on national estimates. Hypertension is defined as a systolic reading greater than 160 mm Hg. or a diastolic reading greater than 90 mm Hg.

Source: "Blood Pressure Levels of Persons 6-74 Years (U.S. 1971-1974)," Vital and Health Statistics, Series 11, No. 203, DHEW.

Cancer

Frequency or prevalence of the problem

In 1977, 15,125 persons died from cancer in Michigan. It has been estimated that 25 percent of the population now alive will eventually have cancer, and 18 percent of the population will die from it, unless new methods of prevention, treatment or cure are found. Cancer is the second leading cause of death in Michigan; 57 percent of the deaths occur in the Michigan population aged 65 and over. Cancer death rates for both Michigan and the United States have increased steadily from 1900 to 1977 (Figure 25). In 1977 more than half of all cancer deaths were due to tumors of the digestive or respiratory organs (Table 26).

The American Cancer Society has indicated that among women, cancer far exceeds any other disease as the cause of working years lost. Among men, it is third after accidents and heart disease.

Impact of the problem

Cancer affects all of the body's major systems. The degree of disability depends on the site affected and the stage of illness. An estimated 2.2 percent of the population in 1974 (182,000 people in Michigan) had limitations of activity due to cancer. In addition to these limitations, cancer requires often painful and expensive treatment and hospitalization for acute exacerbations of the condition. Long-term treatment and rehabilitation are frequently necessary. The impact on the family may be especially severe.

In 1973, 115 families with family members who had died of cancer were studied to determine the costs of the illness for the family. For 97 percent of the families studied, the total costs were more than $5,000, with 20 percent of the families having costs in excess of $30,000 (Table 27).

The average length of stay for patients hospitalized for cancer in 1976 was 12.7 days (Table 13), and the average charge per admission for Medicare patients in 1973 for four selected types of malignant neoplasms was $1,600 (Table 15).

In 1977, 17 hospitals in Michigan reported 339 beds available for oncology services, and 34 were equipped for cobalt therapy. In 1978, an oncology center cost more than one million dollars for equipment alone.

Community concern about the problem

Concern about cancer has centered on known or suspected cancer-causing agents, with frequent newspaper articles and television coverage of this topic. Citizens groups involved in this area include the Michigan Lung Association, the

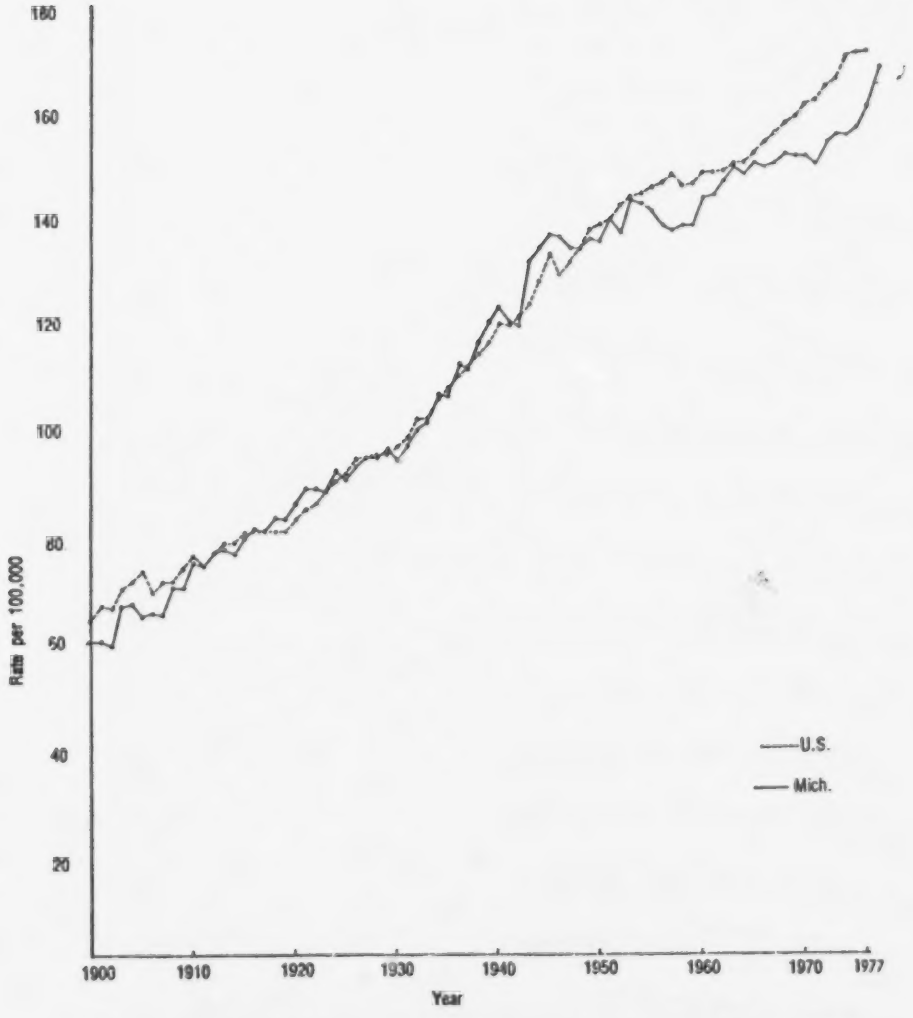
American Cancer Society, and the Michigan Cancer Foundation. Both individuals and community groups have expressed concern through efforts to limit smoking in order to reduce the risk of lung cancer. Many individuals are also participating in cancer screening programs. Cancer is a priority health problem in both state and Health Systems Agency (HSA) health plans.

Cancer is included in the new Public Health Code (Act 368, Part 54, Sections 5401-5439). This legislation provides for a chronic disease prevention and control program, including treatment and rehabilitation for those with cancer.

FIGURE 25

CANCER DEATH RATES

MICHIGAN AND UNITED STATES RESIDENTS [1] 1900-1977 [2]



[1] National rates are from Death Registration States for 1900-1932 and the United States for 1933-1977.

[2] Cancer death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration.

TABLE 26

NUMBER AND PERCENT OF CANCER DEATHS BY SITE AFFECTED

MICHIGAN RESIDENTS 1977

Site Affected	Number of Cancer Deaths	Percent of all Cancer Deaths
All Cancer Deaths	15,125	100.0
Malignant neoplasm of digestive organs	4,208	27.8
Malignant neoplasm of respiratory organs	3,807	25.2
Malignant neoplasm of genito-urinary organs (except uterus)	1,976	13.1
Leukemias	1,436	9.5
Malignant neoplasm of breast	1,359	9.0
Unspecified or ill-defined site	841	5.6
Malignant neoplasm of uterus	394	2.6
Malignant neoplasm of eye, brain, nervous system	406	2.7
Malignant neoplasm of skin and musculoskeletal system	287	1.9
Other	411	2.7

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

TABLE 27

ESTIMATED TOTAL COSTS OF CANCER
FROM ONSET OF ILLNESS TO DEATH
OF PATIENT

1973

Cost of Illness[1]	No. Families	Percent
Under $5,000	3	2.6
$5,000 - $9,999	15	13.0
$10,000 - $14,999	28	24.4
$15,000 - $19,999	16	13.9
$20,000 - $24,999	18	15.7
$25,000 - $29,999	12	10.4
$30,000 - $39,999	16	13.9
$40,000 - $49,999	4	3.5
$50,000 and over	3	2.6
Total	115	100.0

[1]Costs are direct expenses (hospital, doctor, supplies, home nursing services, etc.) only and do not include lost wages of patient or other family members due to the illness. Data are based on self-reports of family members.

Source: "The Impact, Costs, and Consequences of Catastrophic Illness on Patients and Families," A Report of a Social Research Study of Selected Families Stricken by Advanced Cancer, March 1973, by Cancer Care, Inc. and the National Cancer Foundation, Inc.

Renal Disease

Frequency or prevalence of the problem

Renal disease was responsible for 850 Michigan deaths in 1977 with another 3,369 deaths occurring in which renal disease played a contributory role. Mortality rates have dropped in recent years due to the development and use of dialysis and transplantation. The major impact of kidney disease on the general population is in the form of acute genitourinary conditions which affect 1.3 percent of all males and 6.0 percent of all females, a total of 328,000 people.

Impact of the problem

It has been estimated that 1.2 percent of the population (109,000 people in Michigan) may have activity limitations due to kidney-related disease. According to the National Kidney Foundation, urinary tract infection and kidney disease comprise the principal cause of work loss for women. The annual economic loss for Michigan due to kidney disease is estimated to be 160 million dollars.

The average length of stay for persons hospitalized in 1976 for diseases of the urinary system was 7 days (Table 13). The average charge per admission for Medicare patients in 1973 for kidney infections was $992 (Table 15).

End-stage renal disease is classified as a "catastrophic illness" because of the high cost of treatment for patients with end-stage disease. These patients are under dietary and activity restrictions and must have either dialysis or kidney transplant operations.

The initial cost of dialysis treatment may be as high as $27,000 (Table 28). Problems related to end-stage disease treatment arise from the present distribution of the highly specialized services required to treat the disease, which are clustered in the urban medical centers and physically far removed from persons living in rural parts of the state.

The federal government now pays for treatment for end-stage disease, at an annual cost of one billion dollars nationwide. In 1976 95,000 hemodialysis procedures were performed in hospitals in Michigan.

Community concern about the problem

Community concern about renal disease centers on the high cost of end-stage treatment, both for the individual and for the community. Concern is expressed by newspaper articles, the willingness of individuals to participate

in kidney donor programs, and the work of individuals involved in the Kidney Foundation of Michigan. Renal disease is included as a health problem in the state health plan.

Urinary tract infection is a problem of concern among women. Periodically, there are articles in the press concerning preventive measures.

Federal legislation has been enacted to provide payment for treatment of end-stage renal disease. Renal disease is included in the new Public Health Code (Act 368, Part 54, Sections 5401-5439). This legislation provides for a chronic disease prevention and control program, including treatment and rehabilitation for those with renal disease.

TABLE 28

ESTIMATED COSTS OF RENAL FUNCTION SUBSTITUTION

Methods	Estimated Costs
Initial Cost of Dialysis	$27,000 (annualized)
Renal Transplant (First year)	
Successful	$27,000
Failed	$37,000
Continuous Ambulatory Peritoneal Dialysis	$13,500 per year

Source: Bureau of Disease Control and Laboratory Services, Michigan Department of Public Health.

Metabolic and Degenerative Diseases

Frequency or prevalence of the problem

In 1977, diabetes mellitus caused the death of 1,615 Michigan residents. The National Commission on Diabetes reports that diabetes now affects 10 million Americans, 5 percent of the population. Michigan's share of this total is approximately 455,000. The disease strikes women 50 percent more often than men, and strikes blacks and other races 20 percent more often than whites. Although death rates due to diabetes have increased since 1900, there appears to be a decrease in deaths in the past few years (Table 29).

Arthritis, while not a leading cause of death, is a major cause of disability. It is estimated that there are 1.5 million people suffering from arthritis in the state.

Impact of the problem

Adult onset diabetes necessitates lifelong management, treatment, and rehabilitation. Persons with diabetes face an increased risk of death and may need to be hospitalized for diabetic coma. They are also at higher risk with other medical problems and during pregnancy. Persons with diabetes face dietary and activity restrictions, often require the use of insulin, and must be under medical monitoring. Diabetes in children, unlike that in adults, usually occurs as a rapidly developing illness which may, in a few hours or days, lead to coma. The control of diabetes is more complicated in this age group, because dietary and insulin requirements change with increased growth, activity is more erratic, and infections are more frequent and severe. Childhood diabetes also has an impact on the family in requiring parental involvement in diet and medication, as well as the increased risk of diabetic crisis or coma for children.

In 1976 an estimated 464,000 Michigan residents (5.1 percent of the state's population) had some degree of activity limitation due to diabetes. The average length of stay for people hospitalized for diabetes was 10.4 days (Table 13) and the average charge per hospitalization for Medicare patients in 1973 was $1,138 (Table 15).

Arthritis causes often severe crippling and pain, as well as restrictions of activity. A comprehensive treatment program involving home and hospital physical therapy and exercise may be required. Juvenile arthritis has an impact on both the child and the family. More than 1.5 million Michigan residents, 16.8 percent of the population, are estimated to have some degree of limitation of activity due to arthritis and rheumatism. The average charge per hospitalization for Medicare patients hospitalized for osteoarthritis in 1973 was more than $1,400 (Table 15).

Community concern about the problem

Concern about diabetes and arthritis is expressed by newspaper articles and individual involvement in the Michigan Diabetes Association and the Michigan Arthritis Foundation. Arthritis and diabetes are included in state and Health Systems Agency (HSA) health plans.

Legislation concerning arthritis and diabetes is included in the new Public Health Code (Act 368, Part 54, Sections 5401-5439). This legislation provides for a chronic disease prevention and control program, including treatment and rehabilitation for those with diabetes and arthritis.

TABLE 29

NUMBER OF DEATHS AND DEATH RATES[1] DUE TO DIABETES

MICHIGAN RESIDENTS 1900-1977

Year	Number of Deaths	Death Rate per 100,000
1900	224	9.3
1905	267	10.2
1910	398	14.2
1915	498	15.4
1920	577	15.7
1925	746	17.5
1930	880	18.2
1935	1,228	24.3
1940	1,408	26.8
1945	1,561	28.7
1950	1,438	22.6
1955	1,415	19.6
1960	1,784	22.8
1965	2,153	26.3
1970	2,180	24.6
1975	1,819	19.9
1976	1,719	18.9
1977	1,615	17.7

[1]Rates per 100,000 population.

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

PROBLEMS OF PREGNANCY, BIRTH, AND DEVELOPMENT

Infant and maternal mortality rates have dropped sharply in recent decades, and the vast majority of Michigan births are now without complications and result in healthy babies (Figure 30). However, there are still many babies born in circumstances that are regarded as a high risk for both mother and child.

High risk births include those to teenage, often unmarried, mothers; to older mothers; to mothers from poverty areas who may not receive adequate prenatal care; and to mothers who are at risk for medical reasons, such as diabetes. Mothers and infants at risk often have psychosocial problems which directly affect their health and their parent-child relationships.

The "prematurity" rate, the proportion of infants born weighing 2,500 grams (about 5½ pounds) or less, has not decreased, and has, in fact, increased in certain high risk groups. These small, often underdeveloped, infants are most prone to neurological defects, including cerebral palsy and mental retardation. Further improvement in the outcome of pregnancy depends on the early identification of high risk births and the transfer of these patients to hospitals equipped for perinatal intensive care.

A significant number of children have handicapping conditions that require special treatment, often lifetime care and services. These conditions include congenital defects, which may be apparent either at birth or not until several years later; structural disorders caused by disease or accident, such as respiratory distress syndrome or mental retardation due to anoxia during the birth process; and metabolic disorders, such as Tay Sachs disease.

A particular problem area is that of unwanted pregnancies or births to mothers without adequate child-raising skills and resources. A large proportion of these births are the results of teenage pregnancies, leading to problems of interrupted schooling, higher risk of child abuse or neglect, and increased dependency on the welfare system. The adolescent mother often has special emotional and social problems in addition to the physical problems associated with the pregnancy.

Problems Related To Pregnancy And Delivery

Frequency or prevalence of the problem

An estimated 10 to 15 percent of Michigan births (about 13,000 to 19,500 each year) fall into a high risk category, and about 4 percent of all newborns (5,200) require intensive care. Deaths during the perinatal period, which extends from the end of the 20th week of gestation through the 7th day after birth, are an important indicator of problems of pregnancy and birth. During the period from 1970 through 1977, the perinatal mortality rate[3] for Michigan residents declined from 26.0 to 17.6. Nevertheless, in 1977 the number of deaths occurring in the relatively short perinatal period (2,456) was nearly as great as the number of deaths of all persons aged one week to 20 years (2,632). During the three-year period 1974-76, there were 8,057 perinatal deaths occurring in Michigan, with a death rate of 20.0 (Table 31).

Perinatal mortality rates are higher than the state average in Michigan communities which have a large ghetto area or proportion of low income residents -- areas such as Detroit, Berrien County, Grand Rapids, Saginaw and Muskegon have premature birth percentages and perinatal death rates consistently higher than the state as a whole. Within these communities, these ratios are much higher in selected census tracts.

Perinatal deaths vary with the age of the mother. with increased risk for teenage mothers, and mothers of age 40 or more (Table 32). A disproportionately large number of perinatal deaths occur to low birth-weight infants conceived by extremely young unwed mothers. Young women who grew up and are now living under marginal economic conditions constitute a particularly vulnerable group. In 1977 there were 23,011 births to women under the age of 20, with 288 of these births occurring to women who had received no prenatal care. A total of 9,923 babies were born weighing 2,500 grams (about 5½ pounds) or less, with 22 percent (2,233) born to mothers under the age of 20. There were also 822 births to mothers age 40 and older, with 11 of these occurring to women who had received no prenatal care (Table 33).

There were 1,306 births in 1977 with at least one congenital anomaly mentioned, with 247 of these births occurring to women under 20 years of age (Table 34). There were also 33,803 births with at least o complication mentioned (Table 34).

Impact of the problem

The major impact of complications of pregnancy and delivery is an increased risk of both maternal and infant mortality and morbidity, as well as increased lengths of hospitalization for mother and child. For the mother this may mean additional work loss. The emotional impact on the family, particularly in the case of infant death, may be especially severe.

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[3] Perinatal deaths per 1,000 deliveries (live births plus fetal deaths).

The impact on the community includes the cumulative cost of individual medical expenses and work loss, plus the costs of maintaining facilities and staff for maternal and neonatal intensive care. In 1977 there were 18 hospitals in the state with neonatal intensive care units or special newborn nursery units and 5 facilities with maternal intensive care units. There were 80 hospitals with premature nurseries.

In 1975 the estimated costs for complications of pregnancy, childbirth, and the puerperium in the United States was more than 3.6 billion dollars. Researchers have estimated that the average cost of saving the life of a very low birth-weight infant is almost $90,000 (1976 dollars).

Community concern abouth the problem

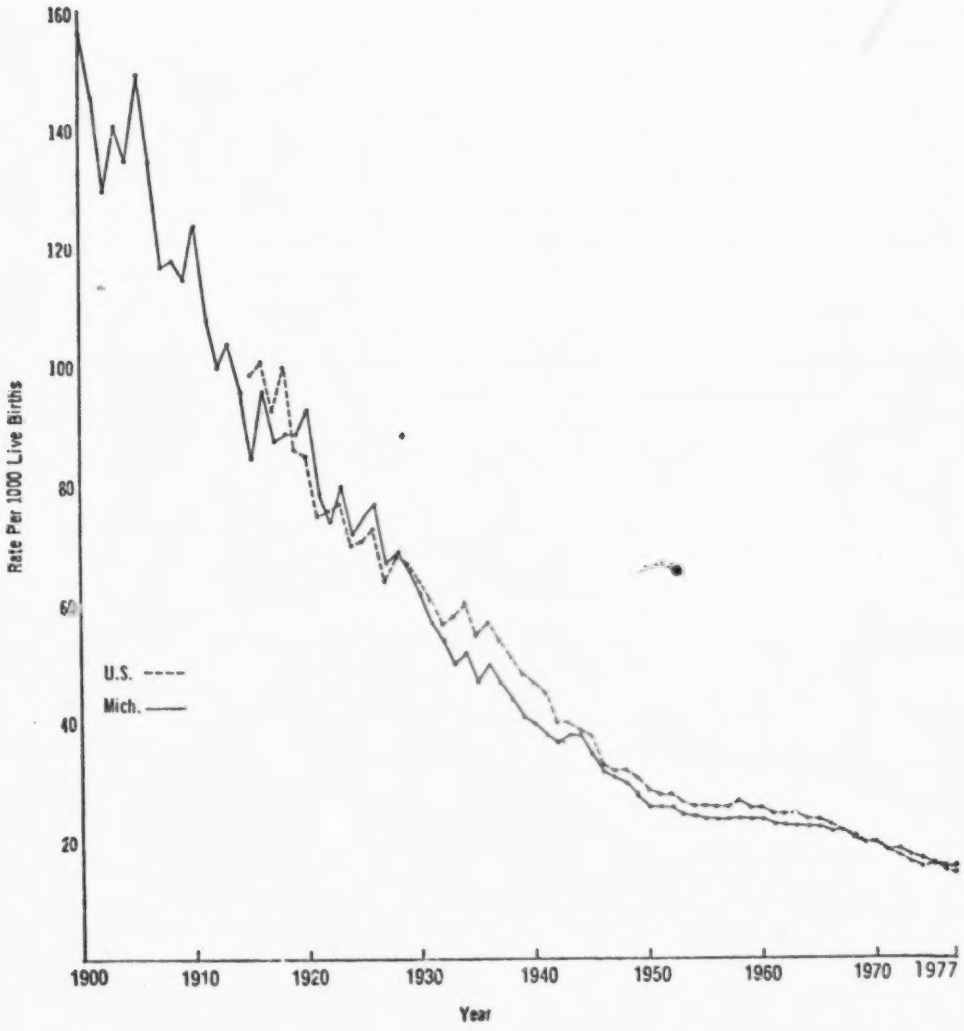
Community concern about complications of pregnancy and delivery is expressed most noticeably by the high proportion of pregnant women seeking prenatal medical care, either privately or through publicly funded clinics. Organizations such as the National Foundation-March of Dimes have been active in educating the public to the need for adequate prenatal care. There has been extensive media coverage, particularly for teenage high risk groups. Perinatal mortality is covered in state and Health Systems Agency (HSA) health plans as a priority health problem for the state.

Federal legislation has been passed setting up supplemental food programs for women who may be at high risk due to inadequate nutrition (P.L. 92-433 and P.L. 94-105), and Title V of the Social Security Act, as amended, provides for improved pregnancy outcome programs in selected states. Michigan is included among the states with such programs.

FIGURE 30

INFANT MORTALITY RATES

MICHIGAN AND UNITED STATES RESIDENTS 1900-1977



Source: "Michigan Health Statistics: Annual Report 1976," Michigan Department of Public Health, Office of Vital and Health Statistics, updated.

TABLE 31

NUMBER OF DELIVERIES[1], NUMBER OF FETAL DEATHS AND HEBDOMADAL[2] DEATHS, NUMBER OF PERINATAL DEATHS, AND PERINATAL DEATH RATE[3], MICHIGAN OCCURRENCES

1974-76

1974-76	Occurrences
Total Deliveries [1]	403,564
Perinatal Deaths	8,057
Fetal Deaths	*4,116*
Hebdomadal Deaths[2]	*3,941*
Perinatal Death Rate[3]	20.0

[1]Live births plus fetal deaths.

[2]Deaths of persons less than 7 days of age.

[3]Perinatal deaths per 1,000 deliveries.

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

TABLE 32

NUMBER OF PERINATAL DEATHS, NUMBER OF BIRTHS, AND PERINATAL DEATH RATE, ACCORDING TO AGE OF MOTHER

MICHIGAN RESIDENTS 1976

Age Of Mother	Perinatal Deaths	Total Births	Perinatal Death Rate
All Ages	2,480	132,649	18.7
Under 15	14	411	34.1
15-19	524	22,846	22.9
20-24	867	47,623	18.2
25-29	643	41,710	15.4
30-39	396	19,173	20.7
40 or more	32	866	37.0
unknown	4	20	-

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

TABLE 33

NUMBER AND PERCENT OF LIVE BIRTHS WITH NO PRENATAL CARE
BY AGE OF MOTHER AND RACE OF CHILD

MICHIGAN RESIDENTS, 1977

Age of Mother	Births With No Prenatal Care							
	All Races		White		All Other		Not Stated	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Under 15 Years	19	44.6	9	61.2	10	35.8	-	-
15-19 Years	269	11.9	168	10.5	101	15.4	-	-
20-24 Years	244	4.9	150	3.6	94	11.1	-	-
25-29 Years	130	3.0	85	2.3	45	8.1	-	-
30-39 Years	95	4.4	62	3.4	33	10.6	-	-
40 Years and Over	11	13.4	7	10.8	4	23.3	-	-
All Ages	768	5.5	481	4.2	287	11.9	-	-
Median Age of Mother	22	...	22	...	22	...	-	-
Total Live Births	138,416	...	114,042	...	24,212	...	162	...

Source: Office of Vital and Health Statistics, Michigan Department of Public Health

TABLE 34

NUMBER OF LIVE BIRTHS WITH CONGENITAL ANOMALIES
OR BIRTH COMPLICATIONS MENTIONED, BY RACE OF INFANT AND AGE OF MOTHER

MICHIGAN 1977

Race of Infant	Age Of Mother							
	All Ages	Under 20 Yrs.	20-24 Years	25-29 Years	30-34 Years	35-39 Years	40 Yrs. & Over	Not Stated
	Congenital Anomalies							
Total Live Births	1,306	247	485	361	151	46	16	-
White	1,016	162	379	297	131	34	13	-
All Other	290	85	106	64	20	12	3	-
	Birth Complications							
Total Live Births	33,803	5,664	11,734	10,396	4,495	1,249	261	4
White	26,634	3,732	9,295	8,727	3,701	981	196	2
All Other	7,169	1,932	2,439	1,669	794	268	65	2

Source: Office of Vital and Health Statistics, Michigan Department of Public Health

Problems of Infancy and Development

Frequency or prevalence of the problem

In 1977 there were 1,945 infant deaths in Michigan, with congenital anomalies and Sudden Infant Death Syndrome (SIDS) being the leading causes of death (Table 35).

Across the nation, SIDS is currently the largest single cause of post-neonatal infant mortality. Among all infant deaths in Michigan, only congenital anomalies, taken as a group, claim a higher toll. SIDS is usually defined as the sudden and unexpected death of a previously healthy infant, usually between 1 and 6 months of age, which remains unexplained after careful post-mortem studies. In 1977, there were 237 cases of sudden infant deaths, and 311 cases of deaths due to congenital anomalies.

In 1977, there were 1,306 live births with at least one congenital anomaly reported (Table 36). It is suspected that the number of children who were damaged during the perinatal period, but lived, is several times higher than the number of deaths reported for this period, and it has also been estimated that approximately 40 percent of all severe cases of mental retardation result from factors which impact during the perinatal period.

There are many children in Michigan with handicapping conditions that require short-term or long-term treatment and rehabilitation services. These conditions include neurological disabilities, vision, speech, and hearing difficulties, and other handicapping conditions. Neurological disabilities in infants, children, and young adults affect about 4 percent of the population, with at least 2 percent being significantly involved. Most of the affected individuals have mental retardation, cerebral palsy, epilepsy, learning or behavior disorders, or some combination of these. (See section on Mental Retardation and Developmental Disabilities in Mental and Emotional Health Problems and section on Vision, Hearing and Speech Disorders in Other Health Status Problems.)

Genetic diseases may also affect infants and children. These include sickle cell disease, Tay Sachs, and genetic causes of mental retardation, such as Downs Syndrome. Approximately 0.5 to 1.0 percent of the black population have sickle cell disease which is often severely incapacitating in childhood and results in death, usually by the fourth decade. Approximately 8 percent of blacks have a sickle cell trait which usually causes no ill health but which may be passed on to offspring as a disease. Phenylketonuria (PKU) is an inherited metabolic defect which causes mental retardation if undetected. In 1978 there were 38 newborns in the state with presumptive positive tests for PKU. Of these, 8 were identified as having classical PKU and 6 as having hyperphenylalaninemia. The ratio of classical PKU cases to live births in Michigan for 1978 was approximately one in 17,000.

Congenital hypothyroidism is the most common readily preventable cause of mental retardation. Of the 52,109 infants screened in 1977-78, 12 had presumptive positive screening tests for thyroxine and thyroid stimulating hormone and are currently being treated for hypothyroidism. The ratio of hypothyroidism cases to total screened was thus one in 4,300.

Impact of the problem

The impact of congenital defects or other complications of the newborn includes pain and suffering for the child and often the need for costly neonatal intensive care and/or long-term medical evaluation, treatment, and followup. Particularly serious defects, such as severe mental retardation or multiple handicaps, may require long-term institutional care for the child. The impact on the family of a handicapped child, both emotionally and financially, is especially severe. Such families often require a multitude of long-term support services to cope with the difficulties involved, as well as provide adequate treatment for the child. The impact on the child may range from dietary restrictions to limits on activities, to the need for institutional care or special classroom facilities.

The cost to the community is extensive, since many of these children require lifelong treatment and support services. The cost of institutional care is often borne by the community, as well as costs for screening and diagnosing affected children and providing adequate educational opportunities. Because of the high cost of treating handicapped children, as well as the need for long-term support, many families are unable to meet the costs and must rely on community support for medical care.

In 1978, in addition to neonatal care units set up and staffed in hospitals, there were 12 developmental disabilities centers, with a total of 6,169 beds. Although data on the cost of all complications of the newborn and child are not available, the estimated costs of congenital anomalies alone in the United States for 1975 was estimated to be more than 1.5 billion dollars.

Community concern about the problem

Community concern about congenital defects and other handicapping conditions for children is expressed through extensive media coverage and public support and involvement for organizations such as the National Foundation-March of Dimes, the National Association for Retarded Citizens, and the Easter Seal Society of Michigan. Developmental disabilities are included in state and Health Systems Agency (HSA) health plans, as well as being addressed in the "State Developmental Disabilities Plan" developed by the Michigan Department of Mental Health and the Michigan State Planning Council for Developmental Disabilities.

Legislation has been passed in a number of areas relating to handicapping conditions of children, dating back to 1937 (Act 158, P.A. 1937, Crippled Childrens Act). Problems of infancy and development are addressed in the new Public Health Code (Act 368, Part 58, Sections 5801-5879). This legislation provides for prevention, casefinding, and treatment programs for crippled children.

TABLE 35

INFANT DEATHS BY CAUSE OF DEATH

MICHIGAN RESIDENTS 1977

ICDA Number	Cause of Death	Frequency
740-759	Congenital Anomalies	311
795.0	Sudden Infant Death Syndrome	237
777	Immaturity Unqualified	155
776.9	Asphyxia of Newborn	137
764-768 (.0-.3), 772	Birth Injuries	60
470-474, 480-486	Influenza and Pneumonia	57
Residual 000-136	Other Infective and Parasitic Diseases	54
E800-E949	Accidents	43
390-398, 402, 404, 410-429	Heart Disease	31
008-009	Enteritis and Other Diarrheal Diseases	22
320	Meningitis	22
550-553, 560	Hernia and Intestinal Obstruction	16
430-438	Cerebrovascular Disease	9
E960-E978	Homicide	6
140-209	Malignant Neoplasms	6
210-239	Benign Neoplasms	5
580-584	Nephritis and Nephrosis	3
466	Acute Bronchitis and Bronchiocitis	3
250	Diabetes Mellitus	2
280-285	Anemias	2
490-491	Chronic and Unqualified Bronchitis	2
441-448	Other Diseases of Arteries, etc.	1
571	Cirrhosis of the Liver	1
E980-E999	All Other External Causes	1
574, 575	Cholelithiasis, Cholecystitis and Cholangitis	1
Residual 760-778	Other Diseases of Early Infancy	681
	ALL OTHER DISEASES	77
	TOTAL	1,945

Source: Office of Vital and Health Statistics, Michigan Department of Public Health

TABLE 36

CONGENITAL ANOMALIES[1] REPORTED BY TYPE OF ANOMALY

MICHIGAN RESIDENTS 1977

Type of Anomaly	ICDA Number	Number of Conditions	Rate per 100,000 Live Births
Other Congenital Anomalies of Limbs	755	394	284.6
Clubfoot (Congenital)	754	171	123.5
Congenital Anomalies of Genital Organs	752	160	115.6
Cleft Palate and Cleft Lip	749	132	95.4
Congenital Syndromes Affecting Multiple Systems	759	101	73.0
Congenital Anomalies of Heart	746	70	50.6
Congenital Anomalies of Skin, Hair and Nails	757	55	39.7
Spina Bifida	741	52	37.6
Congenital Anomalies of Ear, Face and Neck	745	52	37.6
Other Congenital Anomalies of Musculoskeletal System	756	38	27.5
Other Congenital Anomalies of Digestive System	751	35	25.3
Congenital Hydrocephalus	742	34	24.6
Other and Unspecified Congenital Anomalies	758	34	24.6
Other Congenital Anomalies of Upper Alimentary Tract	750	30	21.7
Anencephalus	740	27	19.5
Other Congenital Anomalies of Circulatory System	747	23	16.6
Congenital Anomalies of Urinary System	753	19	13.7
Other Congenital Anomalies of Nervous System	743	18	13.0
Congenital Anomalies of Eye	744	14	10.1
Congenital Anomalies of Respiratory System	748	12	8.7
At Least One Anomaly[2]		1,306	943.5

[1]Indicates anomalies apparent soon after a live birth.

[2]Does not equal the sum of anomalies specified because of the occurrence of multiple anomalies.

Source: Office of Vital and Health Statistics, Michigan Department of Public Health

Unintended and Unwanted Pregnancies

Frequency or prevalence of the problem

Teenage sexual activity has increased in recent years. This, coupled with inconsistent and inefficient use of contraceptives and lack of accurate information regarding the fundamentals of reproduction, results in teenage pregnancies. Births to unwed teenagers between the ages of 15 and 19 is on the increase. And many of the mothers who are in their teens and unwed have repeat pregnancies at 15, 17 and 19. In 1977 there were 23,011 births to mothers in Michigan who were under 20 years of age (Table 37).

The number of births to adolescents does not present a complete picture of the problem of adolescent pregnancy in Michigan. Data on the number of adolescent pregnancies terminating in abortion or miscarriage are not available, but based on United States data, it can be estimated that the total number of adolescent pregnancies is more than 70 percent greater than the number of births reported (Table 38). Nationally, one-third of all girls between the ages of 15 and 20 have at least one unwanted pregnancy.

In addition to unwanted pregnancies among teenage mothers, there are also families where adequate family planning is not available or accessible for economic, social, or personal reasons. In 1977 there were 5,678 births in the state that were fifth births or higher, 359 of these to women under the age of 25.

Impact of the problem

The major impact of unintended and unwanted pregnancies is a continuing cycle of economic dependency, interrupted schooling for young mothers, and increased risk of child abuse or neglect. Children born to teenage mothers, as well as the mothers themselves, are at high risk during the prenatal period and at birth. Because of the cyclical nature of early pregnancy, the children are likely themselves to become teenage parents, dependent on welfare.

The unwanted pregnancy in an established family places increased financial, physical and emotional burdens on the parents and also results in increased risk of child abuse and neglect.

The cost to the community is very high. In addition to providing additional medical facilities and services for both prenatal care and abortions due to unwanted pregnancies, the community is often required to support these children as welfare recipients, often in a pattern over several generations. Half of all payments for Aid to Families with Dependent Children goes to women who had their first child when they were teenagers. In 1975 these payments amounted to more than 2.3 billion dollars nationally. Thus, there is the cost both of public assistance, since these families are not economically self-sufficient, and the direct cost of providing services.

Community concern about the problem

Community concern about unwanted pregnancies is expressed through extensive press coverage and public involvement in groups such as the Planned Parenthood Association. Concern is also expressed by the number of individuals using some method of contraception, either through public clinics or private medical care providers. Unwanted pregnancies are included in state and Health Systems Agency (HSA) health plans.

State and federal legislation has been enacted in the area of family planning (Act 303, P.A. 1965, Family Planning Act; P.L. 91-572; Federal Family Planning Act; Act 226, P.A. 1977, Birth Control Information in Schools Act).

TABLE 37

NUMBER OF LIVE BIRTHS BY AGE AND RACE OF MOTHER

MICHIGAN RESIDENTS 1977

Race of Mother	Age Of Mother							
	All Ages	Under 20 Yrs.	20-24 Years	25-29 Years	30-34 Years	35-39 Years	40 yrs. & Over	Not Stated
Total Live Births	138,416	23,011	49,740	43,346	17,293	4,178	822	26
White	114,042	16,139	41,191	37,719	14,908	3,420	649	16
All Other	24,374	6,872	8,549	5,627	2,385	758	173	10

Source: Office of Vital and Health Statistics, Michigan Department of Public Health

TABLE 38

ESTIMATED OUTCOMES OF TEENAGE PREGNANCIES

MICHIGAN 1974

Est. Total Pregnancies	46,820
Est. Total Births[1]	27,269
Est. Abortions	12,816
Est. Miscarriages	6,735

Source: Bureau of Personal Health Services, Michigan Department of Public Health, estimates based on: Frederick S. Jaffe and Joy G. Dryfoos, "Fertility Control Services for Adolescents: Access and Utilization", Family Planning Perspectives, Volume 8, No. 4, July/August, 1976.

[1]Actual number of births in Michigan in 1974 was 26,478.

MENTAL AND EMOTIONAL HEALTH PROBLEMS

Mental illness and emotional disturbance cause dysfunction and disability, and an estimated one out of ten persons will at some time require mental health services. Mental illness may result from biological, psychological, and/or environmental factors. Linked to these problems are deaths and injuries resulting from acts of violence, including homicide, suicide, child abuse and spouse abuse.

Mental retardation and related developmental disabilities, often congenital, impair the ability of many persons to learn and adapt to the demands of society. A disproportionate number of the retarded can be found in improverished rural and urban areas. Developmental disabilities, which include cerebral palsy, epilepsy, and autism, originate before a person reaches the age of 18, can be expected to continue indefinitely, and seriously impair a person's ability to function normally within society.

Mental Illness and Emotional Disturbance[4]

Frequency or prevalence of the problem

The frequency and prevalence of mental illness is estimated at 10 to 15 percent of the population (between .9 and 1.4 million people in Michigan). Estimates vary depending on the definition of what constitutes mental illness, or mental health. The President's Commission on Mental Health estimated that nationally, 15 percent of the population suffer from some form of mental illness. In 1977 there were more than 24 million reported visits to doctor's offices for mental disorders nationally. This does not include treatment in hospitals, community mental health centers, or other facilities serving the mentally ill. In 1977 in Michigan there were more than 38,000 patient care episodes in inpatient psychiatric services and 317,000 patient care episodes in outpatient psychiatric services (including both general and psychiatric hospitals). According to national data, schizophrenia is the most frequent diagnosis for both inpatient and outpatient services (Table 39).

In 1977 suicide was the 8th leading cause of death both in Michigan and for the United States as a whole, and homicide was the 10th leading cause. In Michigan, homicide and suicide were the 2nd and 3rd leading causes of death for persons between the ages of 15 and 34. There were 1,280 suicides and 946 homicides in the state in 1977. In addition to deaths from these causes there were an unknown number, probably much greater, of attempted suicides and homicides.

Accurate data on child and spouse abuse are difficult to obtain, since these crimes are greatly underreported. The FBI, for example, estimates that only 10 percent of all incidents of spouse abuse are ever reported. Although statewide data are not available, statistics from various studies and police reports give some indication of the problem:

> In Detroit 4,900 wife assault complaints were filed in 1972.
>
> A study conducted in 1975 by the School of Social Work at Western Michigan University found that spouse assault occurs in a minimum of 500 to 600 families each year in Kalamazoo County.
>
> A 1976 study of battered women in Ingham County estimated 1,537 incidences of wife assault for one year for the county.

While child abuse also is often unreported, statistics are available on those cases which are reported. In 1977 there were 27,427 reports of alleged abuse and/or neglect of children in the state (Table 40).

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[4]Fuller descriptions of these problems may be found in publications of the Department of Mental Health.

There has been a steady increase in the number of reported cases of abuse and neglect, although it is difficult to determine if the increase is due to an actual increase in abuse and neglect or to better reporting.

Impact of the problem

The impact of mental illness and emotional disturbances on the individual may include feelings of anxiety, depression, or unhappiness, inability to function at work, school, or in family/social settings, the need for acute or short-term hospitalization, or even death due to suicide or homicide. In Michigan, in 1977, the average length of stay for psychiatric patients in acute care general hospitals was 13.3 days. There were 19,033 such hospitalizations. In addition, there were 19,071 hospitalizations in 22 psychiatric hospitals.

Many problems of mental illness involve all family members; family impact in the case of suicide or homicide is especially severe. Child and spouse abuse have a severe psychological as well as physical impact and involve the entire family.

The impact on the community includes work loss, cumulative costs of treatment, including hospitalization, and the cost of maintaining facilities. In 1977 there were 22 psychiatric hospitals in the state, with a total of 5,696 beds.

Community concern about the problem

Community concern about mental illness is expressed through media coverage and involvement in citizens groups such as the Michigan Association for Emotionally Disturbed Children, the Michigan Society for Mental Health, the American Schizophrenia Foundation, and Recovery, Inc. Organizations specifically addressing issues of child and spouse abuse, such as the Council for the Prevention of Child Abuse and Neglect and Parents Anonymous, are also active in the state. At the federal level, a Presidential Commission on Mental Health was appointed in 1978 to make recommendations on mental health issues. In addition, the long-time support for a Department of Mental Health as one of the principal agencies of the state government attests to the continual concern over mental health and mental retardation as well (see description in section on mental retardation). Mental illness, including domestic violence, is included in state and Health Systems Agency (HSA) health plans.

State legislation includes the Mental Health Code (Act 258, P.A. 1974) and the Child Protection Law (Act 238, P.A. 1975). The new Public Health Code (Part 23, Sections 2301-2321) provides for consultation between the state Department of Public Health and the Department of Mental Health in determining priority health problems and basic health services for the state in the area of mental illness.

TABLE 39

NUMBER OF PATIENT CARE EPISODES IN INPATIENT AND OUTPATIENT PSYCHIATRIC SERVICES, ACCORDING TO AGE AND DIAGNOSIS

UNITED STATES 1971

(Data are based on reporting by facilities)

A. Inpatient Psychiatric Services

Diagnosis[1]	All ages	Under 18 years	18-24 years	25-44 years	45-64 years	65 years and over
	Number of episodes					
All diagnoses	1,692,752	111,021	245,106	614,901	512,379	209,345
Mental retardation	46,766	5,835	7,396	14,779	14,384	4,382
Organic brain syndromes	157,691	3,649	8,364	15,441	44,124	86,113
Schizophrenia	537,174	21,341	85,043	232,520	151,270	47,000
Depressive disorders	321,708	8,657	34,036	123,571	118,526	36,918
Other psychotic disorders	27,810	1,199	2,383	7,492	9,991	6,745
Alcohol disorders	227,626	870	10,142	95,518	106,245	14,851
Drug disorders	68,162	7,357	32,153	21,727	5,252	1,673
All other disorders	263,403	56,361	58,011	88,589	52,933	7,509
Undiagnosed	42,412	5,752	7,588	15,264	9,654	4,154

B. Outpatient Psychiatric Services

Diagnosis[1]	All ages	Under 18 years	18-24 years	25-44 years	45-64 years	65 years and over
	Number of episodes					
All diagnoses	2,316,754	632,216	436,535	818,232	375,852	53,919
Mental retardation	75,843	49,429	12,221	9,597	4,404	192
Organic brain syndromes	58,462	15,479	4,567	12,098	11,977	14,341
Schizophrenia	363,945	20,694	70,924	183,292	84,179	4,856
Depressive disorders	293,553	15,593	58,477	119,358	87,147	12,978
Other psychotic disorders	34,041	1,209	4,182	9,984	17,134	1,532
Alcohol disorders	125,394	1,503	5,377	60,062	53,751	4,701
Drug disorders	48,907	5,715	19,968	18,584	4,512	128
All other disorders	1,037,325	418,894	212,470	314,630	81,038	10,293
Undiagnosed	279,284	103,700	48,349	90,627	31,710	4,898

[1]The diagnostic groupings used in this table are defined in terms of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, DSM-II. They are: Mental retardation, 310-315; Organic brain syndromes, 290, 292, 293, 294 (except 294.3), 309 (except 309.13, 309.14); Schizophrenia, 295; Depressive disorders, 296, 298.0, 300.4; Other psychotic disorders, 297, 298.1-298.9; Alcohol disorders, 291, 309-13, 303; Drug disorders, 294.3, 309.14, 304.

NOTE: Includes such services provided in freestanding outpatient psychiatric clinics, State and county mental hospitals, private mental hospitals, psychiatric units of general hospitals (including VA), and Federally funded community mental health centers. (Data are based on reporting by facilities.)

Source: National Institute of Mental Health: Patient care episodes in psychiatric services, United States, 1971. Statistical Note, No. 92. DHEW Pub. No. (HSM) 74-655. Rockville, Md., Aug. 1973.

TABLE 40

NUMBER OF REPORTS OF ALLEGED ABUSE AND/OR NEGLECT OF CHILDREN

MICHIGAN 1967-77

Year	Number Of Reports
1967	514*
1968	766*
1969	856*
1970	7,864
1971	12,519
1972	16,404
1973	19,805
1974	20,234
1975	20,425
1976	26,697
1977	27,427

*Abuse cases only; neglect data not available before 1970.

Source: Council for the Prevention of Child Abuse and Neglect

Mental Retardation and Related Developmental Disabilities[5]

Frequency or prevalence of the problem

There are an estimated 407,480 developmentally disabled persons in Michigan (4.39 percent of the state population). Approximately 50 percent of these individuals are substantially handicapped, requiring extensive long-term support and services (Table 41).

The Michigan State Society for Autistic Children reports a prevalence rate of .05 percent for autism, with 100 percent of the individuals considered to be substantially handicapped. The Michigan Chapter of the United Cerebral Palsy Association reports a prevalence rate of .34 percent for cerebral palsy, with 50 percent substantially handicapped. Many of these individuals are multiply handicapped, with either convulsive disorders or mental retardation in addition to cerebral palsy. The Michigan Epilepsy Center estimates a 1 percent prevalence rate for epilepsy, half the national prevalence, with 50 percent substantially handicapped. The Michigan Association for Retarded Citizens estimates a 3 percent prevalence rate for mental retardation, with 50 percent of these individuals being substantially handicapped. Individuals with developmental disabilities are also more likely to have vision, speech, or hearing difficulties or other medical problems. For all types of developmental disability, the estimated total number of persons affected is over 400,000 (Table 41).

Impact of the problem

The impact of developmental disabilities on the individual involves some limitation in the ability to function normally. For many developmentally disabled individuals this will be a severe limitation, requiring institutional care or a supervised living situation. These conditions are often severe lifelong handicaps, and many of the developmentally disabled will never be able to live or work independently. Family impact is especially severe.

The cost to the community is extremely high, due to the inability of many of these individuals to be self-supporting and their need for extensive lifelong services. In 1978 there were 12 developmental disabilities centers, in addition to numerous adult and child foster care and group living facilities. As of June 1978 there were 7,495 developmentally disabled persons being served in developmental disabilities centers, with an additional 1,149 persons under the legal authority of these centers in family foster care or community living situations.

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[5]Fuller descriptions of these problems may be found in publications of the Department of Mental Health.

Community concern about the problem

Community concern about developmental disabilities is shown through media coverage, by participation in genetic counseling and prenatal care programs, and by involvement in public interest groups, which include the Michigan Association for Retarded Citizens, the Michigan Chapter of the United Cerebral Palsy Association, the Michigan State Society for Autistic Children, and the Michigan Epilepsy Foundation. Developmental disabilities are included in state and Health Systems Agency (HSA) health plans.

Extensive state and federal legislation has been passed in this area in recent years, including the Developmentally Disabled Assistance and Bill of Rights Act (P.L. 94-103, 1975). Genetic diseases are included in the new Public Health Code (Act 368, Part 54, Sections 5401-5439) under the section on chronic diseases, which provides for casefinding, treatment, and rehabilitation programs for those with genetic diseases and testing of all newborns for phenylketonuria (PKU). The Department of Public Health is also required to cooperate with the Department of Mental Health in the establishment of a statewide program for genetic screening and counseling in the area of disabilities.

TABLE 41

ESTIMATED NUMBER AND PERCENT OF DEVELOPMENTALLY DISABLED PERSONS BY AGE, ACCORDING TO TYPE OF DISABILITY

MICHIGAN 1978

Age Group	Type Of Disability					Total Population
	Mental Retardation	Epilepsy	Cerebral Palsy	Autism	All Types	
Percent of Total Population	*3.0*	*1.0*	*.34*	*.05*	*4.39*	*100.00*
0 - 4	21,000	7,000	2,380	350	30,730	700,000
5 - 17	66,350	22,115	7,519	1,105	97,090	2,211,560
18 - 25	44,220	14,740	5,011	737	64,710	1,474,100
26 - 59	108,800	36,270	12,331	1,813	159,215	3,626,800
60+	38,090	12,700	4,316	634	55,735	1,269,600
All Ages	278,460	92,820	31,550	4,640	407,480	9,282,000

Source: "Michigan State Developmental Disabilities Plan, Fiscal Year 1977-1978," Michigan State Planning Council For Developmental Disabilities and Michigan Department of Mental Health.

OTHER HEALTH STATUS PROBLEMS

Vision, Hearing and Speech Problems

Communication handicaps, defects in speech or hearing, and vision defects affect a large segment of the population, particularly increasing among the aged. While seldom a cause of death, such conditions are often lifelong handicaps, requiring ongoing treatment or correction.

Frequency or prevalence of the problem

Communication handicaps, speech and hearing, affect almost 8 percent of the population. There are from 3 to 5 percent of Michigan children with hearing loss that is handicapping or potentially handicapping. The problems of 90 percent of these children can be resolved or significantly lessened with early discovery and timely medical intervention. These disorders are somewhat more prevalent among children from lower socio-economic conditions. They are considerably more prevalent among developmentally disabled children. Many of these children have communicative handicaps resulting from the conditions that have made them disabled (Table 42).

Each year approximately 20,000 Michigan children enter school for the first time with defects of vision. Over a million of Michigan's current child population, about 40 percent, will need treatment for defective vision by age 17. One child in seven will have severe vision loss by age 12. There are an estimated 700 blind and 6,000 visually impaired children in Michigan. About 2,000 children, mostly boys, will sustain eye injuries each year requiring doctors' attention. Some of these injuries result in loss of vision. In 1977 10 percent of all children screened in the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program required follow-up for vision problems, and 3 percent required follow-up for hearing problems (Table 43). Of the preschool and school-age children who were screened in vision programs during 1977-78, 5.6 percent and 8.0 percent, respectively, were referred for medical attention.

Among mentally retarded children, the prevalence of eye problems is much greater than that found in the general population, and the defects are generally much more severe. Multiply-impaired children who have vision problems need special attention; there are over 200 deaf-blind children in Michigan. In addition, 70,000 boys and 7,000 girls have a color-vision defect and may be at a disadvantage in school and later in career opportunities. Most of the approximately 900,000 people receiving health care in the Medical Assistance program (Medicaid) are in need of periodic eye care.

Vision and hearing impairments are among the most frequently reported chronic conditions and impairments for elderly people living in the community; 92 percent of these people wear glasses and 5 percent wear hearing aids. In 1974, according to national estimates, almost half (49 percent)

of the elderly in nursing homes could not see well enough to read an ordinary newspaper regardless of whether they wore glasses; one-third (35 percent) could not hear a conversation on an ordinary telephone; and one-fourth (24 percent) had impaired speech.

Impact of the problem

A major impact of hearing and speech problems for the individual is often a communications difficulty. Such handicaps in young children may require extensive treatment and rehabilitation in order to assure normal functioning, and some individuals will have a lifelong impairment of functioning as a result of these conditions. These are particularly handicapping in developmentally disabled or multiply-handicapped individuals. Acute conditions may require hospitalization and result in permanent hearing loss. In 1974 the average length of stay for persons hospitalized for diseases of the ear and mastoid process was 3.7 days. Diseases of the ear accounted for more than 18 million days of bed disability in the United States in 1977.

The impact of vision impairment may range from a need for glasses or other vision aids, involving periodic professional examination and treatment, to restrictions of activity and limitations of function due to blindness. Persons with complete vision loss require extensive training and rehabilitation for adequate functioning. The impact of vision impairment on developmentally disabled and multiply-handicapped individuals, often children, is especially severe.

Cost to the community for vision, hearing, and speech loss includes work loss time, cumulative costs of hospitalization and medical treatment, and the cost of providing facilities and staff to treat these conditions. Extensive screening programs requiring trained staff are set up throughout the state, both in schools and through programs to screen children for vision, hearing, and speech problems, and facilities are maintained for treatment and rehabilitation of individuals with these conditions.

Community concern about the problem

Community concern about vision, hearing, and speech problems is shown through media coverage, and through involvement in groups such as the Michigan Association for Better Hearing and Speech, the Michigan Society for the Prevention of Blindness, and the American Foundation for the Blind. Concern is also expressed through the number of persons, particularly children, participating in hearing and vision screenings.

State legislation in this area dates back to 1949 (Act 278, P.A. 1949, Hearing Screening Act). The new Public Health Code (Act 368, Part 93, Sections 9301-9329) mandates local health departments to set up and publicize free periodic hearing and vision testing and screening programs for children within their jurisdictions.

TABLE 42

NUMBER AND PERCENT OF SCHOOL AGED, PRE-SCHOOL AGED, AND DEVELOPMENTALLY DISABLED CHILDREN SCREENED, AND NUMBER AND PERCENT REFERRED FOR HEARING LOSS, BY TYPE OF REFERRAL, HEARING SCREENING PROGRAM, 1977-78

Screening Results	Children Screened			
	All Children	School Aged	Pre-School Aged	Developmentally Disabled
Children screened	576,395	500,474	63,353	12,558
Percent of total	100.0	86.8	11.0	2.2
Children with hearing loss	46,409	39,656	5,517	1,236
Percent of group	8.1	7.9	8.7	9.8
Type of referral				
Medical attention				
Number	19,937	15,880	3,308	749
Percent[1]	3.5	3.2	5.2	6.0
Non-medical specialists				
Number	14,327	12,782	955	590
Percent[1]	2.5	2.5	1.5	4.7

[1]Percent of children screened in this group.

Source of the data: Hearing and Speech Section Performance Report, 1977-78, Michigan Department of Public Health: Hearing Screening results.

TABLE 43

NUMBER AND PERCENT OF CHILDREN TESTED IN EPSDT[1] PROGRAM REFERRED FOR VISION AND HEARING PROBLEMS, ACCORDING TO AGE AND TYPE OF TEST

MICHIGAN 1977

Type of Test	Total Number Tested	Follow-Up Indicated					
		All Ages		Ages 0-5		Ages 6 and Over	
		Number	Percent of Tested	Number	Percent of Tested	Number	Percent of Tested
Vision Screening	98,833	9,496	10	1,648	5	7,848	12
Hearing Screening	114,922	4,005	3	1,208	3	2,797	4

[1]Early and Periodic Screening, Diagnosis, and Treatment Program.

Source: "Early and Periodic Screening, Diagnosis, and Treatment (EPSDT), Annual Report, 1977," Michigan Department of Public Health and Michigan Department of Social Services.

Dental Problems

Frequency or prevalence of the problem

Dental problems such as dental decay and peridontal disease affect almost all of the population. A significant proportion of these problems become serious because of a lack of dental care. Dental problems are often caused or made worse by behavioral factors, such as high dietary intake of refined sugar and inadequate preventive dental health care.

A significant portion of the population have lost all of their teeth. The percent of edentulous persons (those missing both upper and lower teeth) has been estimated at 14.7 percent of the adult population aged 18-74, based on dental examinations of a national population sample conducted in 1971-74, and 11.2 percent based on a national health interview survey conducted in 1971. This proportion increases greatly with age; 24 percent of those aged 45 to 64 and 45 percent of those aged 65 to 74 have lost all of their teeth (examination data). In areas with nonfluoridated water supplies, 50 percent of all children have 1 or more decayed teeth by age 3, and 70 percent have 3 or more decayed teeth by age 4, yet only 10 percent of all children under the age of 5 visit a dentist annually.

Peridontal disease is a degenerative disease of the soft and bony tissues supporting the teeth which gradually destroys these tissues; it is a major cause of loss of teeth in adults. By age 55, 83 percent of the population has experienced peridontal disease.

According to state estimates for 1974-76, based on data from the National Health Interview Survey, 53 percent of the population saw a dentist at least once during the year. However, only 30 percent of the population 65 years of age and older, and 38 percent of persons other than white visited a dentist during the year. In addition, those under 65 reported twice as many visits per person per year as those 65 and over; whites reported twice as many visits per person per year as all other races (Table 44). In 1977 an estimated 9.3 percent of the U.S. population had never seen a dentist, and 13.9 percent had not seen a dentist in the past 5 years.

In 1977 22,451 children (20 percent of those screened) seen in the screening clinics of the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program were referred to dentists (Table 45).

Impact of the problem

Dental problems result in pain and suffering, costs for treatment, and work loss for acute conditions requiring hospitalization or bed disability. Next to the common cold, dental decay is the leading cause of school absenteeism for children. Severe dental problems result in loss of teeth; subsequent inability to adequately chew and digest food results in malnutrition and problems of growth and development, as well as adversely affecting speech and appearance.

The cost to the community includes cumulative work and school loss and medical costs; dental conditions accounted for 8.9 million days of bed disability in the United States in 1977. In 1976 an estimated 8.6 billion dollars was spent on dental services in the United States (Table 46).

Community concern about the problem

Community concern about dental problems is expressed by the number of persons receiving preventive dental care and dental treatment and by media coverage of dental hygiene. Oral health is included in state and Health Systems Agency (HSA) health plans as a health problem for Michigan.

State legislation includes the Fluoridation of Public Water Supplies Act (Act 346, P.A. 1968).

TABLE 44

ESTIMATED NUMBER OF DENTAL VISITS PER PERSON PER YEAR AND PERCENT OF PERSONS WITH A DENTAL VISIT IN A YEAR

MICHIGAN 1974-1976

Age, Sex, Race	Estimated Number of Dental Visits Per Person Per Year	Percent of Persons With A Dental Visit Within One Year
All Persons	2	53
Age		
Under 17 Years	2	53
17-44 Years	2	60
45-64 Years	2	47
65 Years and Over	1	30
Sex		
Male	2	52
Female	2	54
Race		
White	2	55
All Other	1	38

Source: Data from the National Health Interview Survey, "State Estimates of Disability and Utilization of Medical Services: United States, 1974-76," DHEW Publication No. (PHS) 78-1241.

TABLE 45

NUMBER AND PERCENT OF CHILDREN REFERRED TO DENTISTS IN EPSDT[1] PROGRAM, BY AGE

MICHIGAN 1977

Age	Total Number Screened	Number Referred To Dentist	Percent Referred to Dentist[2]
All Ages	114,922	22,451	20
0-5	47,709	4,364	9
6 and Over	67,213	18,087	27

[1]Early and Periodic Screening, Diagnosis, and Treatment Program.

[2]Percent of those screened.

Source: Early and Periodic Screening, Diagnosis, and Treatment Program (EPSDT), Annual Report, 1977, Michigan Department of Public Health and Michigan Department of Social Services.

TABLE 46

AMOUNT AND PERCENT OF NATIONAL HEALTH EXPENDITURES FOR DENTAL SERVICES

UNITED STATES, SELECTED FISCAL YEARS 1950-1976

Expenditures For Dental Services	Year					
	1950	1955	1960	1965	1970	1976[1]
Amount (in billions)	0.9	1.5	1.9	2.7	4.5	8.6
Percent of Total Health Expenditure	7.5	8.7	7.3	6.9	6.5	6.2

[1]Preliminary estimates.

Source: Derived from Mueller, M.S., and Gibson, R.M., "National health expenditures, fiscal year 1975." Social Security Bulletin 39(2): 3-20, Feb. 1976. Office of Research and Statistics, Social Security Administration: selected data. In Health *United States *1976-1977, DHEW Pub. No. (HRA) 77-1232.

NUTRITION PROBLEMS

The principal documented nutrition problems of the general population in Michigan are obesity and overweight, growth underachievement and anemia. Persons with chronic disease and acute health problems also have nutritional problems. Unacceptable nutritional status is especially a problem during periods of rapid growth such as infancy, adolescence and pregnancy and during periods of physiological stress, such as surgery or cancer therapy. Nutrition is related to behavioral factors such as poor food selection.

Frequency or Prevalence of the Problem

According to estimates based on data from the National Health and Nutrition Examination Survey, 13.0 percent of all men and 22.7 percent of all women in Michigan between the ages of 20 and 74 can be classified as obese.

In a report issued in 1976, the Health Project, consultant group for the Michigan Legislature, noted that some 1.5 million Michigan residents were at nutritional risk based on their economic status. These individuals would be in danger of serious malnourishment in the absence of federally supported food programs such as food stamps, special supplemental food programs for women, infants and children, and child nutrition programs.

Michigan compares favorably with other states on certain nutrition indices utilized for childhood surveillance for low income pediatric populations (Table 47). There are no statewide nutritional data available which reflect the adult or pediatric population. Table 48 indicates age specific data from the Michigan Early, Periodic Screening, Diagnosis and Treatment (E.P.S.D.T.) program for Medicare children. This at risk group reflects that these low income children under six years have a higher prevalence of growth underachievement (12.1 percent) compared to the state average (9.5 percent). Based on weight for height data, these children under two years are at risk for leanness (3.1 percent) and obesity (11.5 percent) according to the National Center for Health Statistics size charts.

Maternity and infant care projects serving low income, at risk women and children in the outstate area in 1975-76, showed that 26 percent of the women were overweight/obese and 13 percent were underweight prior to pregnancy. At entrance into prenatal care, 34 percent showed blood values suggestive of iron deficiency anemia. Dietary intakes by patient recall reflected that almost 63 percent had poor or inadequate food intakes.

Impact of the problem

The impact of poor nutrition on the individual may include obesity, anemia, or vitamin-deficiency diseases. High sodium diets have been identified as a contributor to hypertension; excess sugar intake contributes to both obesity and dental problems. Obesity is recognized as a risk factor in the following diseases: cardiovascular disease, hypertension, arteriosclerosis, hernia, gall bladder, diabetes, and liver disease. A study conducted in 1973 noted that each 10 percent reduction in weight in men 33 to 55 years

of age would result in about a 20 percent decrease in the incidence of coronary disease. A 1976 National Cancer Institute study noted a correlation between dietary fat intake and the incidence of breast and colon cancer.

The impact on the community includes work loss and medical costs for chronic disease and other conditions related to improper diet.

Community concern about the problem

Community concern about nutrition is expressed through extensive media coverage and growing individual concern about diet and good nutrition. Inadequate nutrition is listed in state and Health Systems Agency (HSA) health plans.

The new Public Health Code (P.A. 368 of 1978) mandates that nutrition services be provided by the state and local health departments (parts 22 and 24). It also establishes a statewide Nutrition Commission, Interagency Committee and Office of Nutrition (Part 36).

TABLE 47

PERCENT OF CHILDREN WITH LOW OR HIGH NUTRITION INDICES; EARLY AND PERIODIC SCREENING, DIAGNOSIS, AND TREATMENT PROGRAM

MICHIGAN AND OTHER STATES, 1977

(Includes only persons less than 18 years of age)

Area		Growth Characteristics And Hematocrit			
	Percent with Hematocrit 31 and below	Percent with Height For Age Below 5th Percentile	Percent with Weight For Age Below 5th Percentile	Percent with Weight For Height	
				Below 5th Percentile	Above 94th Percentile
Other States[1]	3.7	12.0	6.9	4.8	11.7
Michigan[2]	3.0	8.8	5.1	2.4	8.5

[1]Based on data from 15 states.

[2]Based on a review of the EPSDT screening summary forms.

Source: Center for Disease Control, Nutrition Surveillance, Annual Summary, 1977, U.S. Department of Health, Education and Welfare, Public Health Service, issued December, 1977.

TABLE 48

NUMBER OF CHILDREN EXAMINED AND PERCENT WITH LOW OR HIGH NUTRITION INDICES, BY AGE; EARLY AND PERIODIC SCREENING, DIAGNOSIS AND TREATMENT PROGRAM, 1978

(Includes only persons less than 18 years of age.)

	Height For Age		Weight For Age		Weight For Height		
Age Group	No. Exam.	% Low	No. Exam.	% Low	No. Exam.	% Low	% High
< 1	2489	11.8	2497	4.9	2291	3.2	11.0
1	2144	14.4	2146	6.5	2145	3.0	12.0
2-5	8733	10.1	8714	6.2	8701	1.9	7.5
6-9	7522	6.2	7487	4.1	7052	2.1	6.8
10-12	4473	7.4	4459	5.0	1011	2.3	6.5
13-14	2419	7.5	2412	5.2	___	___	___
15-17	2555	8.3	2549	5.4	___	___	___
All Ages	30335	8.8	30264	5.2	21200	2.2	8.1

KEY:

Low Height for Age: Height for age less than the 5th percentile of a person of same sex and age in the reference population.

Low Weight for Age: Weight for age less than the 5th percentile of a person of same sex and age in the reference population.

Low Weight for Height: Weight for height less than the 5th percentile of a person of the same sex and height in the reference population.

High Weight for Height: Weight for height greater than the 95th percentile of a person of the same sex and height in the reference population.

SOURCE: Michigan Department of Public Health,
Bureau of Personal Health Services

Accidents

Accidents are the fourth leading cause of death in the state and result in widespread injury and disability. Included in this category are traffic accidents, industrial accidents, and recreation or sports related accidents which often affect younger age groups, particularly boys.

Frequency or prevalence of the problem

Accidents are the leading cause of death for persons ages 1 to 14 years and the fourth leading cause of death for all ages combined. In 1977, 3,945 persons died of accidents in Michigan. Many times that number received injuries, sometimes permanently disabling, as a result of accidents (Table 51).

About half of the accidental deaths (1,960) were due to motor vehicle traffic accidents. Accidental falls accounted for about 14 percent (564), with another 13.5 percent due to drowning and fires (533). About 6 percent of the deaths (221) were attributed to industrial type accidents. Table 49 gives the distribution of accidental deaths by type of accident.

In the decades since 1900, motor vehicle accidents have been responsible for an increasing proportion of Michigan's accidental deaths (Table 50). The number of injuries reported is about 85 times the number of deaths. State Police reports show that in 1977, 1,950 persons were killed and 166,389 injured in traffic accidents.

Impact of the problem

The individual impact of accidents includes death, injury, pain and suffering, and long-term disability. The cost in terms of medical expenses and work loss is particularly high. Accidents accounted for an estimated 8.2 million days of bed disability and 30.2 million days of restricted activity in Michigan in 1977 (Table 52). Accidents in the home accounted for 26.8 days of bed disability and 97.9 days of restricted activity per 100 persons per year, and accidents at work accounted for 17.6 days of bed disability and 75.7 days of restricted activity per 100 persons per year.

The impact on the community is significant in terms of work loss and cumulative medical costs. Communities also provide emergency medical services, equipment, and staff to provide treatment for accident victims.

Community concern about the problem

Community concern about accidents is shown through extensive media coverage,

individual participation in drivers' training and industrial safety programs, and involvement in such groups as the National Safety Council and Traffic Safety for Michigan.

Both traffic and other accidents are included in state and Health Systems Agency plans.

TABLE 49

ACCIDENTAL DEATHS BY TYPE OF ACCIDENTS

MICHIGAN RESIDENTS 1977

ICDA LIST Number	Type of Accident	Number Of Deaths	Percent
E810-E819	Motor Vehicle Traffic Accidents	1,960	49.7
E880-E887	Accidental Falls	564	14.3
E890-E899	Accidents Caused by Fire and Flames	295	7.5
E910	Accidental Drowning and Submersion	238	6.0
E916-E921, E923-E928	Accidents Mainly of Industrial Type	221	5.6
E911-E912	Inhalation and Ingestion of Food Causing Obstruction	105	2.7
E913-E915, E929	Other Accidents	72	1.8
E870-E877	Accidental Poisoning by Gases and Vapors	69	1.7
E900-E909	Accidents Due to Natural and Environmental Factors	69	1.7
E922	Accidents Caused by Firearm Missile	60	1.5
E840-E845	Air and Space Transport Accidents	59	1.5
E850-E859	Accidental Poisonings by Drugs and Medicaments	58	1.5
E930-E936	Surgical and Medical Complications and Misadventures	44	1.1
E820-E823	Motor Vehicle Non-Traffic Accidents	33	0.8
E830-E838	Water Transport Accidents	33	0.8
E860-E869	Accidental Poisonings by Other Solid or Liquid Substances	29	0.7
E940-E949	Late Effects of Accidental Injury	26	0.7
E800-E807	Railway Accidents	8	0.2
E825-E827	Other Road Vehicle Accidents	2	0.1
	TOTAL	3,945	99.9

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

TABLE 50

DEATH RATES FOR ALL ACCIDENTS AND MOTOR VEHICLE ACCIDENTS

MICHIGAN 1900-1977

Year	Death Rates Per 100,000 Population	
	All Accidents	Motor Vehicle Accidents
1900-04	75.9	n.a.
1920-24	69.2	15.4
1940-44	70.1	27.4
1950-54	59.5	27.7
1960-64	49.2	23.4
1970-74	49.4	25.2
1977	43.2	21.5

Source: Office of Vital and Health Statistics, Michigan Department of Public Health.

TABLE 51

ESTIMATED NUMBER OF PERSONS INJURED AND RATE PER 100 PERSONS PER YEAR, BY CLASS OF ACCIDENT AND SEX

MICHIGAN 1977[1]

Sex	Total[2]	Class of Accident				
		Moving Motor Vehicle		While at Work	Home	Other
		Total	Traffic			
	Estimated Number of Persons Injured (000's)					
Both Sexes	3,177	219	192	493	1,269	1,351
Male	1,857	126	103	396	634	832
Female	1,334	93	83	102	639	528
	Number of Persons Injured Per 100 Per Year					
Both Sexes	34.8	2.4	2.1	5.4	13.9	14.8
Male	41.3	2.8	2.3	8.8	14.1	18.5
Female	28.8	2.0	1.8	2.2	13.8	11.4

[1]Estimates are based on national rates.

[2]The sum of data for the four classes of accidents may be greater than the total because the classes are not mutually exclusive.

Source of rates used for estimation: "Current Estimates from the Health Interview Survey: United States, 1977," Vital and Health Statistics: Series 11, Data from the National Health Survey; No. 126. DHEW Pub. No. (PHS) 78-1554.

TABLE 52

ESTIMATED DAYS OF RESTRICTED ACTIVITY AND DAYS OF BED DISABILITY AND RATE PER 100 PERSONS PER YEAR, BY CLASS OF ACCIDENT

MICHIGAN 1977[1]

Type of Limitation	Total[2]	Class of Accident				
		Moving Motor Vehicle		While at Work	Home	Other
		Total	Traffic			
Restricted Activity						
Number of Days (000's)	30,162	5,587	4,847	6,911	8,937	10,982
Rate Per 100 Persons Per Year	330.4	61.2	53.1	75.7	97.9	120.3
Bed Disability						
Number of Days (000's)	8,161	1,506	1,305	1,607	2,447	3,131
Rate Per 100 Persons Per Year	89.4	16.5	14.3	17.6	26.8	34.3

[1]Estimates are based on national rates.

[2]The sum of data for the four classes of accidents may be greater than the total because the classes are not mutually exclusive.

Source of rates used for estimation: "Current Estimates from the Health Interview Survey: United States, 1977," Vital and Health Statistics: Series 11, Data from the National Health Survey; No. 126. DHEW Publication No. (PHS) 78-1554.

Alcohol and Drug Dependence

Frequency or prevalence of the problem

An estimated 750,000 Michigan residents require services because of alcohol or drug dependence. In 1977, there were 661,136 estimated alcoholics in the state (Figure 53).

Somewhat more than 7.5 percent of the Michigan population age 13 and over (540,000 persons) consume alcohol daily. Of these, approximately one-fifth (104,000 persons) have five or more drinks per day. Alcohol use is greatest in the young adult group (age 18-24), and the proportion of whites who consume alcohol is generally greater than that of other races. The mortality rate for 1976 from alcohol and other drug problems was 12.0 per 100,000 population (1,092 persons).

Alcoholism is a direct cause of cirrhosis of the liver and contributes to other health problems. In 1977, 1,356 Michigan residents died of cirrhosis of the liver, with 32.4 percent of these deaths specifically mentioning alcohol as a contributing factor.

There are also an estimated 35,000 heroin users in Michigan. Health problems of these persons include sleeplessness, shakes, ulcers, infections, lingering colds, and nutritional deficiencies.

Impact of the problem

Alcoholism and other drug dependence impair normal physical and social functioning, as well as contributing to deaths due to chronic illness and accidents. The individual impact of alcohol and other drug problems includes premature death and disability (including deaths due to cirrhosis of the liver), work loss, impaired functioning, and often severe impact on the entire family, employers, and fellow employees. Alcohol is a major cause of deaths and injuries in traffic accidents. Drinking drivers were involved in 58,676 motor vehicle accidents in 1977, with 876 of them fatal (Table 54). In addition to deaths of those using drugs, many other deaths are caused by these persons, particularly in traffic accidents.

The impact on the community for work loss and medical costs is high, as is the cost of providing services, facilities, and staff for the treatment of alcohol and other drug problems. The estimated additional cost of health and medical services due to alcoholism for the state is 492 million dollars. The cost of health resources related to drug dependence is estimated to be 8.6 million dollars.

The cost to the community includes maintaining facilities and programs for persons with alcohol or drug dependence. In 1977, 16 hospitals in Michigan provided inpatient services for alcoholism, 5 provided inpatient services for other drug problems, and 33 provided outpatient services for drug and alcohol dependence.

Community concern about the problem

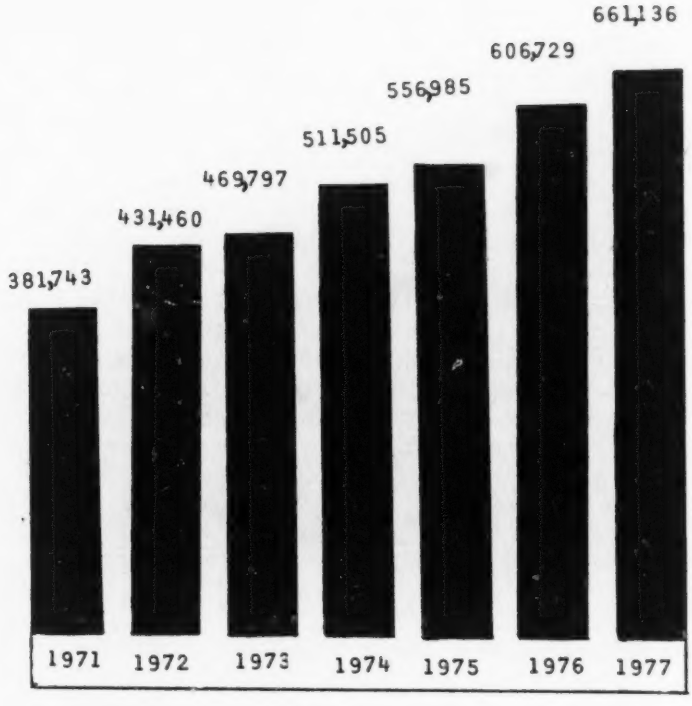
Community concern about alcohol and drug dependence is expressed through extensive media coverage and participation in industry and other alcohol and drug rehabilitation programs. Groups such as the Michigan Council on Alcohol Problems (MICAP), Alcoholics Anonymous and the National Council on Alcoholism are also active in the state. Substance abuse is included as a priority health problem in state and Health Systems Agency (HSA) health plans.

State legislation in this area dates back to 1883 (Act 93, P.A. 1883). Substance abuse is also included in the new Public Health Code (Act 368, Article 6, Parts 61, 62, 65; Sections 6101-6141, 6201-6251, and 6501-6523). This legislation establishes the Office of Substance Abuse Services within the Department of Public Health, which is required to develop a state plan for the prevention and control of substance abuse and the diagnosis, treatment, and rehabilitation of individuals who are substance abusers. Part 65 of the Code provides for protective custody and treatment for incapacitated persons.

FIGURE 53

ESTIMATED NUMBER OF ALCOHOLICS

MICHIGAN 1971-77



Source: "Health in Michigan: A Profile, 1973-1974," Michigan Department of Public Health, Center for Health Statistics.

TABLE 54

A. NUMBER OF CASUALTIES DUE TO ACCIDENTS INVOLVING DRINKING DRIVERS, BY TYPE OF CASUALTY, AND PERCENT OF ALL MOTOR VEHICLE CASUALTIES

MICHIGAN 1977

Type Of Casualty	Number Of Casualties Involving Drinking Drivers	Percent Of All Casualties
All Types	38,778	23.0
Persons Killed	902	46.2
Persons Injured	37,876	22.8

B. NUMBER OF MOTOR VEHICLE ACCIDENTS INVOLVING DRINKING DRIVERS BY TYPE OF ACCIDENT, AND PERCENT OF ALL MOTOR VEHICLE ACCIDENTS

MICHIGAN 1977

Type Of Accident	Number Of Drinking Drivers	Percent Of All Accidents
All Types	58,676	9.2
Fatal	876	32.8
Injury Only	25,063	13.2
Property Damage Only	32,737	7.4

Source: "Comparative Drinking Driver Tables, Michigan 1971, 1976, and 1977," Michigan State Police.

ENVIRONMENTAL HEALTH PROBLEMS

Introduction

Michigan is a highly industrialized state with a resident population of more than nine million, has a varied and significant agriculture, and is surrounded by the Great Lakes which represent a substantial economic and recreational resource. Such multiple use of the state's environment results in unique problems related to environmental contamination by toxic chemicals; existing or potential problems from contamination by carriers of bacterial, mycotic, viral, and parasitic diseases; and problems caused by ionizing radiation.

Table 55 lists environmental agents that are thought to affect human health significantly, given appropriate circumstances. Definite effects, and further possible effects, are indicated. "Appropriate circumstances" may consist of characteristics of the population, such as pre-existing disease; characteristics of the agent, such as concentration or dose; or characteristics of the exposure, such as presence of other agents or length of exposure. An exposure does not necessarily produce the effects described, nor have some of the "possible" effects been definitely established. Table 55, however, outlines the current state of scientific knowledge about harmful effects of substances in the human environment.

Because of the difficulty of defining and measuring these effects or potential effects (except in certain industrial environments) there are few data available to delineate the frequency or prevalence of health problems due to contamination of the general environment of Michigan.

TABLE 55

DEFINITE AND POSSIBLE HEALTH EFFECTS OF ENVIRONMENTAL POLLUTANTS AND EXPOSURES

[Items in parentheses refer to effects other than those directly affecting human health status]

Agent, pollutant, or source	Definite effect	Possible effect
	COMMUNITY AIR POLLUTION—A	
Sulfur dioxide (effects of sulfur oxides may be due to sulfur, sulfur trioxide, sulfuric acid, or sulfate salts)	1. Aggravation of asthma and chronic bronchitis 2. Impairment of pulmonary function 3. Sensory irritation	
Sulfur oxides and particulate matter from combustion sources	4. Short-term increase in mortality 5. Short-term increase in morbidity 6. Aggravation of bronchitis and cardiovascular disease 7. Contributory role in etiology of chronic bronchitis and emphysema 8. Contributory role to respiratory disease in children	9. Contributory role in etiology of lung cancer
Particulate matter (not otherwise specified)		10. Increase in chronic respiratory disease
Oxidants	11. Aggravates emphysema, asthma, and bronchitis 12. Impairs lung function in patients with bronchitis-emphysema 13. Eye and respiratory irritation and impairment in performance of student athletes	14. Increased probability of motor-vehicle accidents
Ozone	15. Impairs lung function	16. Acceleration of aging, possibly due to lipid peroxidation and related processes
Carbon monoxide	17. Impairs exercise tolerance in patients with cardiovascular disease	18. Increased general mortality and coronary mortality rates 19. Impairment of central nervous system function 20. Causal factor in atherosclerosis
Nitrogen dioxide		21. Factor in pulmonary emphysema 22. Impairment of lung defenses such as mast cells and macrophages or altered lung function
Lead	23. Increased storage in body	24. Impairment of hemoglobin and porphyrin synthesis
Hydrogen sulfide	25. Increased mortality from acute exposures 26. Causes sensory irritation	
Mercaptans		27. Headache, nausea, and sinus affections
Asbestos	28. Produces pleural calcification 29. Malignant mesothelioma, asbestosis	30. Contributes to chronic pulmonary disease (asbestos and lung cancer)
Organophosphorus pesticides	31. Acute fatal poisoning 32. Acute illness 33. Impaired cholinesterase activity	
Other odorus compoonds		34. Headache and sinus affections
Beryllium	35. Berylliosis with pulmonary impairment	
Airborne microorganisms	36. Airborne infections	
	FOOD AND WATER CONTAMINANTS—B	
Bacteria	1. Epidemic and endemic gastrointestinal infections (typhoid, cholera, shigellosis, salmonellosis, leptospirosis, etc.)	2. Secondary interaction with malnutrition and with nitrates in water (cf., no. 15)
Viruses	3. Epidemic hepatitis and other viral infections	4. Eye and skin inflammation from swimming
Protozoa and metazoa	5. Amoebiasis, schistosomiasis, hydatidosis and other parasitic infections	
Metals	6. Lead poisoning 7. Mercury poisoning (through food chains) 8. Cadmium poisoning (through food chains) 9. Arsenic poisoning 10. Chromium poisoning	11. Epidemic nephropathy 12. "Blackfoot" disease
Nitrates	13. Methemoglobinemia (with bacterial interactions)	
"Softness" factor		14. Increase in cardiovascular disease
Sulfates and/or phosphates	15. Gastrointestinal hypermotility	
Fluorides	16. Fluorosis of teeth when in excess	

TABLE 55 (Cont.)

[Items in parentheses refer to effects other than those directly affecting human health status]

Agent, pollutant, or source	Definite effect	Possible effect
	LAND POLLUTION—C	
Human excreta	1. Schistosomiasis, taeniasis-hookworm, and other infections	
Sewage		2. Typhus, plague, leptospirosis, and other infectious diseases
Industrial and radioactive waste	3. Storage and effects from toxic metals and other substances through food chains	
Pesticides—lead arsenate	4. Increased storage of heavy metals in smokers of tobacco grown on treated areas	
	THERMAL EXPOSURES—D	
Cold damp	1. Excess mortality from respiratory disease and fatal exposure	
		2. Contributes to excess mortality and morbidity from other causes
	3. Excess morbidity from respiratory and related diseases and morbidity from exposure	
		4. Rheumatism
Cold dry	5. Mortality from frostbite and exposure	
		6. Impaired lung function
	7. Morbidity from frostbite and respiratory disease	
Hot dry	8. Heatstroke mortality	
	9. Excess mortality attributed to other causes	
	10. Morbidity from heatstroke and from other causes	
	11. Impaired function; aggravation of renal and circulatory diseases	
Hot damp	12. Increase in skin affections	
		13. Increase in prevalence of infectious agents and vectors
	14. Heat-exhaustion mortality	
	15. Excess mortality from other causes	
	16. Heat-related morbidity	
	17. Impaired vigor and circulatory function	
	18. Aggravation of renal and circulatory disease	
	RADIATION AND MICROWAVES—E	
Natural sunlight	1. Fatalities from acute exposure	
	2. Morbidity due to "burn"	
	3. Skin cancer	
	4. Interaction with drugs in susceptible individuals	
		5. Increase in malignant melanoma
Diagnostic X-ray	6. Skin cancer and other skin changes	
		7. Contributing factors to leukemia
		8. Alteration in fecundity
Therapeutic radiation	9. Skin cancer	
	10. Increase in leukemia	
		11. Increase in other cancers
		12. Acceleration of aging
		13. Mutagenesis
Industrial uses of radiation and mining of radioactive ores	14. Acute accidental deaths	
	15. Radiation morbidity	
	16. Uranium nephritis	
	17. Lung cancer in cigarette-smoking miners	
		18. Increase in adjacent community morbidity or mortality
Nuclear power and reprocessing plants		19. Increase in cancer incidence
		20. Community disaster
		21. Alteration in human genetic material
Microwaves		22. Tissue damage
	NOISE AND VIBRATIONS—F	
Traffic		1. Progressive hearing loss
Aircraft (including sonic boom)	2. Permanent hearing loss	
		3. Aggravation or cause of mental illness
Vibrations		4. Articular and muscular disease
		5. Adverse effects on nervous system

TABLE 55 (Cont.)

[Items in parentheses refer to effects other than those directly affecting human health status]

Agent, pollutant, or source	Definite effect	Possible effect
	HOUSING AND HOUSEHOLD AGENTS–G	
Heating, cooking, and refrigeration	1. Acute fatalities from carbon monoxide, fires and explosions, and discarded refrigerators	2. Increase in diseases of the respiratory tract in infants
Fumes and dust	3. Acute illness from fumes 4. Aggravation of asthma	5. Increase in chronic respiratory disease
Crowding	6. Spread of acute and contribution to chronic disease morbidity and mortality	
Structural factors (including electrical wiring, stoves, and thin walls)	7. Accidental fatality 8. Accidental injury 9. Morbidity and mortality from lack of protection from heat or cold 10. Morbidity and mortality due to fire or explosion	
Paints and solvents	11. Childhood lead-poisoning fatalities, associated mental impairment, and anemia 12. Renal and hepatic toxicity 13. Fatalities	
Household equipment and supplies (including pesticides)	14. Fatalities from fire and injury 15. Morbidity from fire and injury 16. Fatalities from poisoning 17. Morbidity from poisoning	
Toys, beads, and painted objects	18. Mortality and morbidity	
Urban design	19. Increased accident risks	20. Contribution to mental illness

Source: Statistics Needed For Determining The Effects Of The Environment On Health, Report of the Technical Consultant Panel to the U.S. National Committee on Vital and Health Statistics, July 1977. DHEW Publication No. (HRA) 77-1457.

Toxic Chemicals In The Environment[6]

Use of toxic chemicals in industry and agriculture has led to problems of contamination of the state's air, water, land, and food with such substances as pesticides, methyl mercury, polychlorinated biphenyls (PCB), polybrominated biphenyls (PBB), dioxins, tris, and other chemicals. Inadequate and improper disposal practices have caused an increasing number of potable water supplies to become contaminated with toxic chemicals, particularly near industrial areas. Lead poisoning is a potential problem in many areas because of contaminated residential environments.

Frequency or prevalence of the problem (non-occupational)

The concept of toxicity must be applied in a relative sense. Toxicity is generally considered to be the ability of a chemical to produce an unwanted effect when the chemical has reached a sufficient concentration at a certain site in the body; factors that intervene are route of entry, dosage and dose rate, physiological state, and length of exposure.

Virtually all of the population of Michigan has been exposed to contamination by chemicals which in some circumstances can be considered toxic. As the technology of measurement of chemicals in the environment improves, an increasing number of chemicals are detected in water and food supplies, and in human blood or tissues. Except for certain occupational environments, where toxic chemicals are highly concentrated, few long-run health effects of toxic chemicals have been established.

Based on sample studies of the general population, it appears that most Michigan residents have detectable amounts of PBB (polybrominated biphenyls) within their bodies, as a result of the accidental contamination of animal feed in 1973. The long-run effects are unknown, and studies currently underway have not so far yielded specific statistically measurable findings which could be linked to the chemical. PBB has been found in the breast milk of 96 percent of the nursing mothers in the lower peninsula, and 43 percent of the nursing mothers in the upper peninsula, but does not appear to have had an adverse effect on their babies.

Fish in Michigan waters are known to be contaminated with PCB (polychlorinated biphenyls) and methyl mercury, although recent evidence indicates both types of contamination may be declining. While information on contamination of the general population is not available, a study in 1973 showed that persons who consumed fish from Lake Michigan had amounts of PCB in their blood in direct relation with the amounts of fish eaten regularly. Of those who ate more than the maximum amount of fish recommended by the Department of Public Health,

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[6]This section discusses the problem of toxic chemicals in the general environment. Toxic chemicals in occupational environments are discussed below, as part of the discussion of hazards in the workplace. Publications of the Department of Natural Resources and the Department of Agriculture provide additional detail on contaminants.

82 percent had estimated annual doses of PCB greater than the maximum "safe" dose recommended by the Food and Drug Administration. There were, however, no identifiable health effects due to high levels of PCB. The only information about potential harmful effects of PCB is derived from an accidental poisoning incident in Japan in 1968; however, some of the effects may have been due to impurities in the PCB, such as dioxins, rather than to PCB itself.

In a 1974 study, methyl mercury was found in the blood of persons who ate substantial amounts of fish from contaminated Michigan waters, at levels 2 to 4 times greater than those who did not consume contaminated fish. Of those who ate large amounts of fish from highly contaminated waters (Lake St. Clair), about half (26 of 53 subjects) had amounts in excess of the FDA "safe" level. There were no deaths and no acute symptoms resulting from this exposure, and the long-run significance has not been determined.

A 1972-3 study found residues of DDT in the blood of persons exposed to pesticides, but DDT, even at levels much higher than those found in human tissue, has not been shown to have specific adverse human health effects.

Other known contamination of the general environment in Michigan includes contamination by pentachlorophenol (penta), a wood preservative widely used on farms which has contaminated some dairy cows. Scientists have reported elsewhere that penta has been found extensively in the blood and urine of humans, but no particular health effects have been identified. Dioxin, a highly toxic chemical, has been found in some of the penta, was recently identified as a contaminant of Michigan's Titabawassee River, and may be fairly widespread in the environment as a by-product of burning. The human health effects of such exposure levels are unknown.

Lead poisoning is a recognized health hazard, especially for children. Lead is found in paint used in older homes, in some pottery, in colored newspaper and magazine print, as an additive in gasoline, and in various concentrations in soil, food, water, and air. Paint in the home environment is considered to be the principal source of danger for young children, who may become very sick or mentally retarded, or may die as a result of lead poisoning. Through the health screenings carried out by local health departments under the Early and Periodic Screening, Diagnosis and Treatment (EPSDT) program for Medicaid-eligible children, it was found that almost five percent had excessive lead absorption, according to a blood analysis (Table 56). Further diagnosis by a physician is needed to determine whether poisoning has actually occurred.

A problem of increasing concern in Michigan, as well as in other areas of the United States, is the disposal of toxic chemical wastes. Many techniques for disposal, which were acceptable in previous years, are now recognized as creating hazards. Similarly, accidental spills of toxic chemicals are known to contribute to these long-run hazards. There are indications that such chemicals leach into aquifers from which Michigan people derive their potable water for drinking, cooking, and other household use (Table 57).

Impact of the problem

Outside of occupational environments, where concentrations of toxic chemicals may be high, there is little evidence at present of acute effects on human health. Any chemical is toxic in sufficient quantities, so a non-toxic environment is an unattainable concept. As noted above, PCB, PBB, DDT, and methyl mercury, have all been identified in the blood or tissue of Michigan residents, but no lasting health effects could be determined. In cases of lead poisoning, however, human health effects have been identified.

Public concern has focused on possible long-run impacts of toxic chemicals. There is some evidence that chemicals (not only those considered as toxic) may cause disadvantageous gene mutations, but this evidence is largely based on animal tests and the findings may not apply to humans. It has been suggested that a large proportion of human cancers may be directly associated with environmental agents[7]. This association has been demonstrated for certain chemical and physical agents, largely in industrial environments, but for the general population exposed to moderate levels of a multitude of possible carcinogens, the present state of knowledge precludes assessment of the total environmental hazard.

Finally, there are some laboratory data which indicate that environmental factors may affect prenatal development, resulting in birth defects. Chemicals such as thalidomide are known to have severe effects of this type. In recent years certain pesticides and defoliants have been associated with birth defects. In some cases, a strong effect has been demonstrated in animal experiments, though the evidence with regard to humans is considered inconclusive.

An important impact of the problem of toxic chemicals in the environment, at the current state of scientific knowledge, is fear of unknown hazards. Many persons change their life styles in an effort to minimize toxic intake; seeking, for example, so-called organically grown foods, or questioning the advisability of breast-feeding their infants because of chemicals found in breast milk.

The problem of toxic chemicals in the environment has had a significant and growing economic impact on the community. Advancements in technology have resulted in the ability to detect the presence of individual chemicals in ever-diminishing concentrations. Laboratory animal experiments using high doses and dose rates present findings of mutations, cancers, birth defects, and poisoning. Human health effects of low, or even moderately high concentrations of many of these chemicals cannot be demonstrated, yet there is strong pressure to regulate or eliminate their use in industry or agriculture.

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[7] Including cigarette smoke and food additives, as well as industrial or agricultural chemicals.

An example of the cost to the community of toxic chemicals was the destruction of tons of animal feed, cheese, butter, eggs, and milk products, destroyed because of low levels or traces of PBB; about 45,000 animals and 1.5 million chickens were killed and financial settlements for loss of animals or damages has amounted to more than $38 million. Federal and state expenditures for epidemiologic and medical studies related to human health have amounted to $4.5 million (Table 58). In addition, the food-producing industry was adversely affected by the reluctance of other areas to import any Michigan food products.

The community is also affected by restrictions recommended or assumed because of the fear of toxic chemicals. Sport fishing information, for example, is accompanied by warnings to limit or avoid eating certain species of fish, or fish from contaminated waters. Nursing mothers are offered the opportunity for breast milk testing, and in some rare cases, have been advised not to nurse their infants.

Community concern about the problem

Community concern has been highly evident. Many people change their living and eating habits to avoid these substances. Intensive efforts are underway to develop methodologies to identify harmful human effects, and epidemiologic studies are being mounted to determine whether such effects are detectible in segments of the population. Newspapers, magazines, and television give prominent coverage to new incidents of contamination or new discoveries of existing contamination, and the question of a toxic chemical in the environment (PBB) was a key issue in Michigan's 1978 gubernatorial election campaign. Toxic substances are included in state and Health Systems Agency (HSA) health plans as a priority health problem for the state.

Legislation and regulations have been introduced at all levels of government in an effort to control chemicals in the environment that may be toxic. The new Public Health Code (Act 368, Article 12, Part 121, Sections 12101-12195) designates the Department of Public Health as the agency responsible for protection of human health through control of hazards in the environment, and requires the Department to monitor and evaluate conditions which represent potential and actual environmental health hazards. A Chemicals and Health Center was recently established in the Bureau of Environmental and Occupational Health to coordinate these efforts. The Center is also charged with the responsibility to develop a state "environmental health policy" and an "environmental health services plan."

TABLE 56

NUMBER AND PERCENT OF CHILDREN SCREENED
WHO WERE FOUND TO HAVE EXCESSIVE LEAD ABSORPTION
IN BLOOD ANALYSIS, EARLY AND PERIODIC SCREENING,
DIAGNOSIS, AND TREATMENT PROGRAM

JANUARY 1, 1978 - DECEMBER 31, 1978

Period	Number Of Specimens Analyzed	Excessive Lead Absorption	
		Number	Percent
1-1-78 to 3-31-78	10,412	446	4.28
4-1-78 to 6-30-78	12,237	507	4.14
7-1-78 to 9-30-78	13,405	799	5.96
10-1-78 to 12-31-78	12,189	307	2.52
Total	48,243	2,059	4.27

Source: Bureau of Environmental and Occupational Health, Michigan Department of Public Health

TABLE 57

EXAMPLES OF CURRENT TOXIC CHEMICAL WASTE DISPOSAL ISSUES

MICHIGAN 1979

Problem	Potential human health effect
Disposal of toxic chemicals in landfills incapable of containing such materials (almost every county in Michigan affected).	Chemicals leach into ground water. Drinking water sources become contaminated.
Accidental spills of toxic chemicals during transportation; (potential in any area).	One-time accidents but with long-range effects. Persistent chemicals contaminate ground water.
Deteriorating storage containers leaking industrial chemicals into the soil.	Chemicals leach into ground water. Drinking water sources become contaminated.
Trichloroethylene (degreasing compound) disposed of on ground.	Chemicals leach into ground water. Drinking water sources become contaminated.
Herbicides improperly disposed of in fields.	Chemicals leach into ground water. Drinking water sources become contaminated.

Source of data: Chemicals and Health Center
Michigan Department of Public Health

TABLE 58

FUNDING OF ACTIVITIES RELATED TO PBB AND HUMAN HEALTH

MICHIGAN DEPARTMENT OF PUBLIC HEALTH 1974-79

	State	Federal	Total
1974-75—EXPENDITURES			
Initial Field & Laboratory Work	6,412	16,150	22,562
Contract with Dist. H.D. #5	....	11,800	11,800
Total 1974-75:	6,412	27,950	34,362
1975-76 EXPENDITURES			
State Short Term Studies	6,106	....	6,106
Federal Long Term Studies	....	70,088	70,088
Total 1975-76:	6,106	70,088	76,194
1976-77 EXPENDITURES			
Long Term Studies	39,467	205,385	244,852
Breast Milk Testing	37,972	....	37,972
Mt. Sinai Equipment	32,000	....	32,000
University Diagnostic Testing	6,499	....	6,499
Total 1976-77:	115,938	205,385	321,323
1977-78 APPROPRIATION			
Long Term Studies	215,600	314,400	530,000
Breast Milk Testing	69,500	....	69,500
Medical Examinations	120,000	....	120,000
Health Services	250,000	....	250,000
General Population Survey	....	2,250,000*	2,250,000
Mt. Sinai Lab Studies	52,800	....	52,800
Total 1977-78:	707,900**	2,564,400	3,272,300
1978-79 APPROPRIATION			
Long Term Studies	136,500	394,300	530,800
Breast Milk Testing	155,100	....	155,100
Health Services	100,000	....	100,000
Total 1978-79:	391,600	394,300	785,900
GRAND TOTAL	1,227,956	3,262,123	4,490,079

*Includes 187,600 carry/over from 1976-77 (not included in 1976-77 expenditures)
**Federal and State mix unknown as of 8/78

Source: Michigan Department of Public Health

Contamination of Food and Water Supplies

Potential exposure to water-borne diseases, food-borne diseases, and toxic substances in water and food affects all of the more than 9 million inhabitants of Michigan. Contamination of water is most often caused by the improperly-controlled disposal of sewage and other liquid wastes resulting from domestic uses of water, from industrial wastes and agricultural effluents, and from urban run-off. Food contamination (including milk) may result from diseased animals; or from contamination during processing, transportation, handling in retail markets and in homes; or from contaminated water or ice. The role of water and food contamination in the spread of communicable disease was noted earlier, in the section of the report on communicable disease hazards due to environmental factors.

Frequency or prevalence of the problem

Human health may be affected by ingesting water directly or in food, by using it in personal hygiene or for agriculture, industry, or recreation, and by living near it. Two main categories of hazard are hazards from biological agents following ingestion of water or other contact, or from insects; and hazards from chemical and radioactive pollutants. Water-borne diseases, once very prevalent, are not very common in Michigan today. However, the threat of such problems still exists. Data for the United States as a whole from 1938 through 1974 show that water-borne disease outbreaks are no longer on the decline (Tables 59 and 60). The principal illnesses resulting from contamination of water supplies are gastroenteritis, salmonellosis, shillegosis, and infectious hepatitis (Table 61). Serious water-borne diseases such as typhoid are no longer prevalent in Michigan, but gastroenteritis, infectious hepatitis, and related diseases still occur.

In recent years, there has been a marked increase in the use of chemical and radioactive substances which find their way into water supplies. The problem of toxic chemicals has already been discussed in the previous section of this report, and, as noted, it is difficult to link this form of contamination with specific illness effects. Nevertheless, toxic chemicals in water supplies, as well as in the environment in general, may be related to serious chronic illnesses. As industry in Michigan grows, it is becoming increasingly difficult to find and maintain safe sources for private water supplies. A total of over 2.3 million residents of the state are dependent upon private wells as their sole source of potable water, with many more residents and visitors using private wells for cottages or recreational dwellings. Private water supplies have sometimes been found to be unsafe.

Food-borne disease, in the form of microbial infection or toxic chemical poisoning, is one of the most common forms of non-fatal illness in Michigan. The actual incidence of such illness is unknown. It is estimated, however, that 5 to 10 million cases of gastroenteritis occur annually in the United States; thus Michigan can be estimated to have 270,000 illnesses a year, partly due to contaminated food. Food-borne diseases are usually recognized only if there is a sudden outbreak of a group of illnesses among individuals who consumed the same food, but it is generally thought that illness from contaminated food is increasing.

Impact of the problem

Food- and water-borne illness is usually recognized only if there is a sudden, severe and concentrated outbreak. In such a case, the results can be fatal, particularly to infants. Much of the illness, however, is probably not recognized as being associated with food and water supplies. In addition to suffering, discomfort, or inconvenience, this problem has an economic impact in the form of costs of medicines and medical care, and lost wages.

Communicable diseases resulting from water or food contamination may require epidemiologic follow-up to determine the nature and source of illness, requiring further use of community resources.

The impact of toxic chemicals in food and water supplies has been discussed along with the general topic of toxic substances in the environment. As noted, there is insufficient knowledge about toxic levels or dose rates of most of these substances, and insufficient knowledge about their relationship to chronic disease, to draw firm conclusions about the impact on human health.

Community concern about the problem

Safe public water supplies are expected and taken for granted by the public in Michigan, although public health environmental specialists consider that a potential threat of water-borne disease still exists. Attention in recent years has focused on problems of toxic chemicals, especially in private water supplies. There has been greater concern about chemicals in food supplies, as evidenced by interest in issues such as presence of industrial and agricultural chemicals in the food chain, use of antibiotics in animal feed, and use of chemical food additives.

Extensive state and federal legislation has been passed in the area of environmental health and protection. Federal legislation includes the Federal Water Pollution Control Act (P.L. 92-500) and the Safe Water Drinking Act (P.L. 93-523). State legislation concerning safe water supplies dates back to 1913. Current legislation concerning food and water supplies is contained in the new Public Health Code (Act 368, Part 127, Sections 12701-12771, and Part 129, Sections 12901-12922), and in the state "Safe Drinking Water Act" (Act 399, P.A. 1976). This legislation provides for regulation, inspection and monitoring of water supplies, as well as the regulation of food service establishments and investigation of cases of food-borne diseases.

TABLE 59

NUMBER OF CASES OF WATER-BORNE DISEASE PER OUTBREAK, BY TYPE OF SYSTEM

UNITED STATES 1938-74

Years	All systems	Public systems	Private systems
	Illness per outbreak		
1971-74[1]	171	[2]4,210	28
1966-70	114	166	93
1961-65	680	2,603	39
1956-60	103	207	23
1951-55	125	333	33
1946-50	114	292	43
1938-45	340	1,000	50

[1]Craun, G. F., et al.: Reviw of the causes of waterborne disease outbreaks in the U.S.—1971-1974. *J. Am. Water Works Assoc.* 68(8): 420-424, Aug. 1976.
[2]Includes public and semipublic systems.

SOURCE: Craun, G. F., and McCabe, L. J.: Review of the causes of waterborne disease outbreaks. *J. Am. Water Works Assoc.* 65(1): 74-84, Jan. 1973.

TABLE 60

AVERAGE ANNUAL NUMBER OF WATER-BORNE DISEASE OUTBREAKS, BY TYPE OF SYSTEM

UNITED STATES 1938-70

Years	All systems	Public systems	Private systems
	Number of outbreaks		
1971-74[1]	25	[2]21	4
1966-70	14	4	10
1961-65	11	3	8
1956-60	12	5	7
1951-55	10	3	7
1946-50	23	6	17
1938-45	38	12	26

[1]Craun, G. F., et al.: Review of the causes of waterborne disease outbreaks in the U.S.—1971-1974. *J. Am. Water Works Assoc.* 68(8): 420-424, Aug. 1976.
[2]Includes public and semipublic systems.

SOURCE: Craun, G. F., and McCabe, L. J.: Review of the causes of waterborne disease outbreaks. *J. Am. Water Works Assoc.* 65(1): 74-84, Jan. 1973.

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TABLE 61

NUMBER OF OUTBREAKS AND CASES OF WATER-BORNE DISEASE, BY TYPE OF SYSTEM AND ILLNESS

UNITED STATES 1961-70

Illness	All systems		Private systems		Public systems	
	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases
Total	130	46,374	95	6,564	35	39,810
Gastroenteritis	39	26,546	25	4,498	14	22,048
Infectious hepatitis	[1]30	903	22	664	[1]8	239
Shigellosis	19	1,666	16	939	3	727
Typhoid	14	104	14	104		
Salmonellosis	[2]9	16,706	[2]4	96	5	16,610
Chemical poisoning	9	46	7	42	2	4
Enteropathogenic *E. coli*	4	188	4	188		
Giardiasis	3	176	1	19	2	157
Amebiasis	3	39	2	14	1	25

[1]One gastroenteritis outbreak also included 7 cases of infectious hepatitis.
[2]One gastroenteritis outbreak was preceded by outbreak of 38 cases of salmonellosis.

Hazards In The Work Place

The problems associated with worker exposure to toxic chemicals, hazardous physical agents, and unsafe working conditions have long been recognized in Michigan. These problems are found throughout the environment, but are particularly concentrated in industrial, agricultural, and other work settings. In the general environment, it has been difficult to establish definite links between toxic chemicals and human illness; in the work place, however, epidemiologic studies have indicated a cause-effect relationship for many specific agents. Hazards are intensified because of potentiating or synergistic effects of contaminants in the home and workplace, and workers may, in addition, carry toxic substances into their homes and create hazards for their families.

Typical health hazards include toxic and carcinogenic chemicals and dusts, often in combination with noise, heat, and other forms of stress; and other physical and biological agents. These hazards may act on the senses, be absorbed through the skin, be taken into the digestive tract, or be inhaled into the lungs. The results can be respiratory disease, skin disease, heart disease, cancer, neurological disorders, systemic poisoning, or shortened life expectation due to general deterioration. Safety hazards are those aspects of work environments which can cause burns, electric shock, cuts, bruises, sprains, broken bones, or loss of limbs, eyesight, or hearing.

Table 62 lists the leading occupational health risks in Michigan, and Table 63 summarizes carcinogenic agents that may be associated with various occupations.

Frequency or prevalence of the problem

As of January 1978, 3.8 million people were employed in Michigan -- 40 percent of the population of the state -- in 192,739 work places (Figure 64). The manufacturing industries, with 36.5 percent of the total work force, provide the greatest number and variety of potential hazards. The construction industry, with 4.7 percent of the work force, offers severe potential hazards related to noise, dust, carbon monoxide, toxic or explosive gasses, or reduced oxygen levels in confined spaces. In the service industries, certain industries such as dry cleaning plants present unusual and serious hazards from chemicals and toxic fumes. Problems are not limited to industrial, agricultural, and service industries: professional workers have been studied because of potential effects of X-ray, anesthetics, chemical and biological products, and stress; while the public employment sector, 6.1 percent of the work force, has workers in nearly all types of industrial, construction, and service operations.

Data on the incidences of occupational illnesses in Michigan are very limited. Information for Michigan published by the Federal Bureau of Labor Statistics indicates that approximately one worker in ten (about 380,000 workers) suffers a job-related injury requiring medical treatment, a job transfer, or lost work time. Approximately five percent of the reported cases (about 18,500) are due to illness. Many occupationally-caused diseases, however, develop over an extended period of time and result in illnesses that are prevalent in the general population; therefore, the occupational origin of diseases may be undetected. In some cases, occupational hazards may further aggravate pre-existing conditions, making the disease-occupation relationship even more difficult to establish. There seems to be a general consensus among cancer researchers that a probable 50 percent of all cancer cases are complicated by occupational factors. Much of the respiratory disease that affects workers is also known to be job-related, as well as a small percentage of the heart disease.

Most of the reported occupational health cases (about 95 percent) are due to injury, with the three most common causes of injury being over-exertion (for example, lifting), being struck by a moving object, and falling.

Impact of the problem

The known occupationally-related illnesses are considered to be only a small percentage of the true number of cases that are caused by or aggravated by hazards of the workplace. Thus, much of the impact described in the section on chronic illness, such as pain, disability, work loss, expense, and family disruption, can be attributed to problems of work environments. In recent years, research studies have indicated that women employed in operating rooms, who are exposed to anesthetic gasses, have higher rates of spontaneous abortion and congenital abnormalities among their children than do women who are not exposed. These studies indicate that there may also be a link between occupational hazards and problems of birth and development.

Community concern about the problem

With advances in technology which increase the types and levels of contamination that can be detected, and with epidemiologic research pointing out specific relationships between hazardous agents and disease, there has been a concerted effort to establish new regulations and guidelines for health and safety in the workplace. Unions, industry, and public interest groups are involved in conflicting issues of protecting workers without adversely affecting the job market and the economy in general. This problem has been included in state and Health Systems Agency (HSA) health plans, with recommendations that protection of workers should be increased.

Both state and Federal legislation has been passed addressing occupational health problems, with Michigan statutes dating back to the Occupational Disease Reporting Act of 1911 (Act 119, P.A. 1911).

Regulatory activities are carried out under the Federal Occupational Safety and Health Act of 1970 (P.L. 91-596) and the Michigan Occupational Safety and Health Act of 1974 (Act 154). An Occupational Health Standards Commission, appointed by the Governor, promulgates state occupational health standards. The new Public Health Code incorporated regulation of agricultural labor camps and dry cleaning establishments (Act 368, Article 12, Parts 124 and 133), and Part 56 of Article 5 requires reporting of known or suspected occupational diseases by employees, physicians, hospitals, and clinics.

TABLE 62

LEADING OCCUPATIONAL HEALTH RISKS IN MICHIGAN

Dermatitis	Chemicals cause irritation or damage to the skin
Carbon monoxide poisoning	Carbon monoxide is present wherever combustion products are generated
Chemical intoxication	Caused by inhalation of vapors
Pneumoconiosis	Caused by penetration of dust into the lungs
Hearing loss	Caused by exposure to excessive noise
Carcinogenic	Cancer causing agents are used in many industries (1)
Organic phosphate pesticides	Used in agriculture
Highly toxic metals	Inhalation of fumes is hazardous

(1) See TABLE 63

Source: 1977 Environmental and Occupational Program Budget Statement, Michigan Department of Public Health

TABLE 6?

CARCINOGENIC AGENTS THAT MAY BE ASSOCIATED WITH VARIOUS OCCUPATIONS

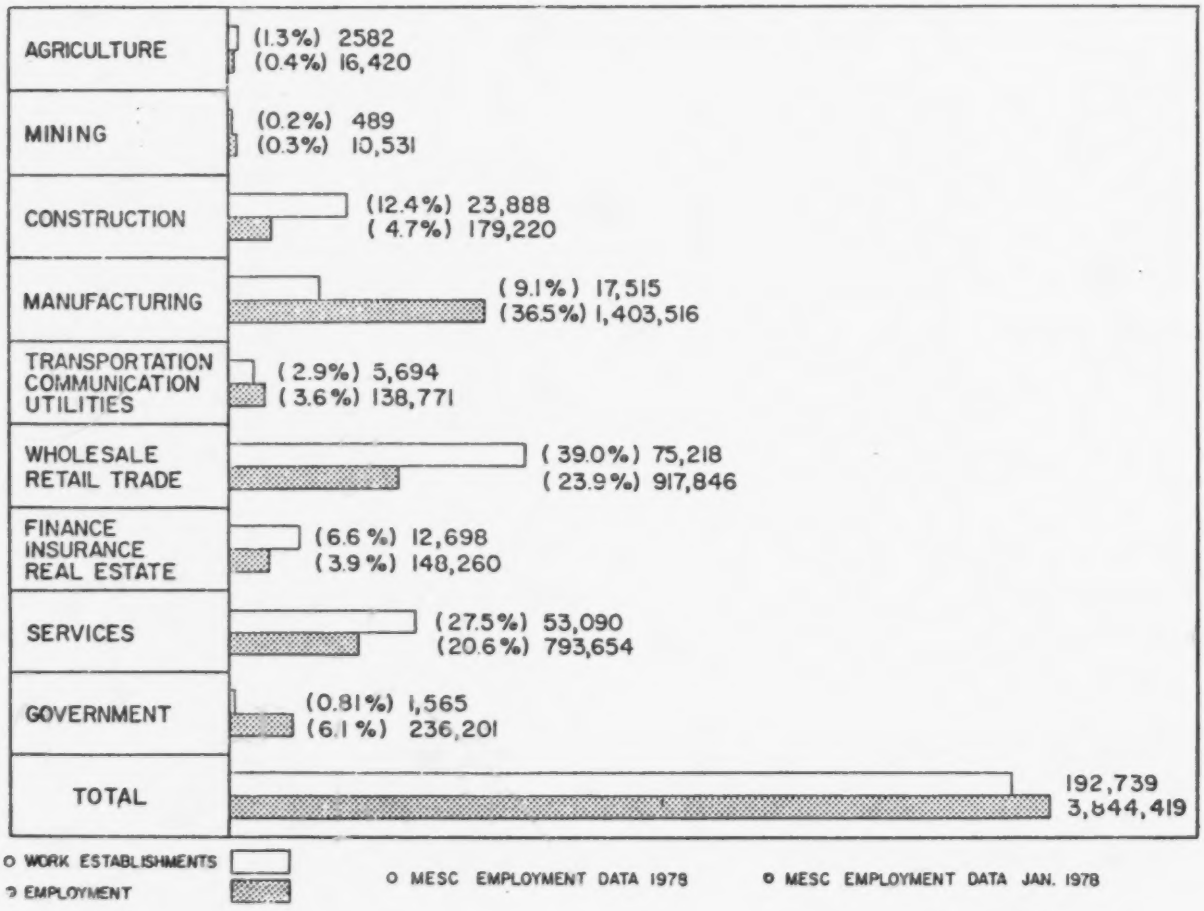
Agent	Sites of cancer	Areas where noted
Specific agents:		
Arsenic	Skin, lung	United States, Great Britain, Germany, France, Argentina, Taiwan, African countries
Coal tar, pitch	Skin, lung	United States, Great Britain
Petroleum	Skin, lung	United States, France, Great Britain, Austria
Shale oils	Skin	United States, Great Britain
Lignite tar, paraffin	Skin	Great Britain, France
Creosote oils	Skin	United States, Great Britain
Anthracene oils	Skin	Great Britain
Soot carbon black	Skin	United States, Great Britain
Mustard gas	Lung	Japan
Cutting (mineral) oils	Skin, possibly respiratory and upper alimentary tract	Great Britain, Australia
Products of coal carbonization	Lung, bladder	Great Britain, United States, Japan
Sunlight	Skin	United States, Argentina, Australia, France, et al.
Chromates	Lung	United States, Great Britain, Germany, Canada
Asbestos	Lung, pleura, peritoneum, gastrointestinal tract	United States, Great Britain, Germany, Canada, S. Africa, Holland, Australia, USSR, Italy, et al.
Aromatic amines, dyes, chemicals used in rubber industry	Bladder, possibly biliary tract, salivary glands	United States, Germany, Great Britain, Switzerland, et al.
X-rays, radium	Skin, lung, leukemia	United States and many other areas
Nickel	Lung, nasal cavity and sinus	Great Britain, Norway, Canada
Benzol	Leukemia	United States, et al.
Isopropyl oil	Lung, larynx, nasal sinus	United States
Radioactive chemicals	Bones, nasal sinus	United States
Chemicals (various)	Lymphoma, pancreas	United States
Vinyl chloride	Liver	United States, Germany, Sweden, et al.
Nonspecific (occupations):		
Wood furniture workers	Nasal cavity, sinuses	Great Britain, United States
Leather workers	Nasal cavity, sinuses, bladder	Great Britain, United States
Soft coal workers	Stomach	United States (1 report)
Machinists, sheet metal workers, carpenters, construction painters	Lung	United States, Great Britain

SOURCE: Modified from Levin, D. L., Devesa, S. S., Godwin, J. D., and Silverman, D. T.: *Cancer Rates and Risks.* DHEW Pub. No. (NIH) 75-691. Washington. U.S. Government Printing Office, 1974.

FIGURE 64

NUMBER OF MICHIGAN ESTABLISHMENTS AND EMPLOYEES
FOR SELECTED CLASSIFICATIONS

1978



Exposure to Ionizing Radiation

The growing use of radioactive materials and devices exposes the public to radiation at levels which may have harmful health effects. Acute effects of ionizing radiation, in sufficient dosages, may include damage to major body systems. Sufficient dosage for this damage, however, is rare except in major accidents. Of greater concern to the population at large is the effect of small doses of radiation over long periods of time, about which much less is known.

Frequency or prevalence of the problem

Radiation exposure of the population includes the following: (1) radiation to patients through medical uses, (2) radiation to occupationally exposed persons who work with radiation sources or radioactive materials, (3) radiation fallout from nuclear tests, (4) radiation from sources such as nuclear power plants, laboratories, medical procedures involving radioisotopes, or industrial research, (5) radiation from radioactive consumer goods or from electronic devices (radioactive dials, fluorescent lamps, color TV sets), and (6) natural radiation in the environment.

Medical and dental diagnostic radiology are considered to account for 90 percent of the man-made radiation dose to which the population is exposed in the U.S. The use of diagnostic X-ray has more than doubled in the last 15 years, and virtually all those in the population who have access to medical or dental care are at risk of receiving cumulative doses which could have adverse health effects. This risk is of special concern because of indications that many X-ray devices in doctors' and dentists' offices are improperly controlled or insufficiently shielded.

Less than 8 percent of the population exposure is attributed to therapy and industrial sources. However, an increasing number of applications are being developed involving the use of ionizing radiation. This growth in technology, coupled with improvement in the availability of medical care (including X-rays) to previously underserved populations, is resulting in an increasing risk of exposure to excessive radiation.

Of the total of 6,815 facilities or services in Michigan in September 1978 which were sources of ionizing radiation, 6,260 (92 percent) were X-ray facilities (Table 65). Radium or radon was used by 125 medical or industrial facilities; with 426 facilities using other radioactive materials. In 1978, there were 12,261 X-ray machines registered in the state, with the greatest number in dental offices.

Impact of the problem

Leukemia and other cancers are known to be among the most serious long-term risks of radiation, with evidence of other damaging or life-shortening effects. The frequency of various types of tumors has been observed to increase in irradiated populations. An example is the frequency of thyroid carcinomas in patients who were given X-ray therapy to the neck in childhood. There is also evidence of cataract formation and possibly neurological damage following high dosage.

It is generally assumed that small amounts of radiation carry some risk of teratogenic effects, thus possibly causing damage to embryos at certain stages of development. Genetic effects of radiation relate to the hereditary material in the germ cells that determine the health, survival, and procreation of future generations. Individuals may have reduced fertility, or their descendents may have genetic disorders, sometimes evident only after many generations.

The organs of the body that are particularly at risk from general irradiation are the gonads (fertility and heredity effects), bone marrow (leukemia), and the eye (cataracts).

Because so many unknown factors are involved, the overall impact and cost to the community of excessive ionizing radiation is unmeasurable and partly undefinable. It is known at the least to result in some specific health problems which are costly and devastating to the individual, such as cancer and birth defects.

Community concern about the problem

There is a high level of concern about the effects of excessive ionizing radiation, as evidenced by political debate and protest movements regarding nuclear power plants. Renewed national and state concern related to nuclear reactors was generated by the Three Mile Island reactor problem in Pennsylvania in 1979. There is only limited awareness, outside professional public health groups, of the risks involved in the form of exposure that is overwhelmingly the most common -- exposure to medical and dental X-ray devices. In recent years there has been an effort to educate the public, as well as medical and dental practitioners, about the dangers of excess exposure, and many people refuse to have routine dental and chest X-rays. Safety in the use of radiological substances is included in state and Health Systems Agency (HSA) health plans.

In recent years there has been increasing state and federal legislation in this area, including the Atomic Energy Act of 1954 (P.L. 703) and the Radiation Control for Health and Safety Act of 1968 (P.L. 90-602). Radiation control is included in the new Public Health Code (Act 368, Part 135, Sections 13501-13536). This legislation provides for the regulation of radioactive material and other sources of ionizing radiation. The Department of Public Health is designated as the radiation control agency for the state.

TABLE 65

NUMBER OF FACILITIES WHICH WERE SOURCES OF IONIZING RADIATION

MICHIGAN SEPTEMBER, 1978

X-ray Facilities	
Hospitals	241
Medical Care Facilities	11
Radiation Laboratories	82
Portable X-ray Services	8
Educational Medical	21
Educational Other	70
Governmental Medical Facilities	59
Other Governmental Facilities	15
Industrial Medical Facilities	82
Other Industrial Facilities	138
Professions: Medical	924
Chiropractic	532
Podiatry	234
Veterinary Medicine	429
Dentistry	3,409
Unclassified	5
All X-ray facilities	6,260
Radium/Radon Users	
Medical Facilities	85
Industrial Facilities	40
All Radium/Radon Users	125
Users of Other Radioactive Materials	
Medical Facilities	218
Industrial Facilities	208
All Users of Other Radioactive Materials	426
Nuclear Power Plants	4
TOTAL	6,815

Source: Division of Radiological Health, Bureau of Environmental and Occupational Health, Michigan Department of Public Health.

Problems Related to Housing and Other Living Conditions

Frequency or prevalence of the problem

Many of the environmental problems discussed in this report affect the housing and general living conditions of people in Michigan. The combined impact of these problems means that some residents of the state -- individuals, families, children, elderly persons alike -- live their daily lives in circumstances that present a constant health hazard. Problems already noted include:

- Toxic chemicals in the form of lead paint, which is especially dangerous to small children,
- Water supplies that are unsafe because of industrial contamination or because of improper handling of sewage and solid waste,
- Insects and rodents that act as carriers of disease.

Added to these problems are other health hazards that exist in many Michigan homes: overcrowding, excessive heat or cold, excessive noise, or generally deteriorated housing. Rodents, in addition to acting as carriers of disease, can inflict direct damage in the form of rat bites, and are responsible for destruction of food supplies.

These problems are prevalent in many impoverished urban and rural areas. Hazardous conditions also exist where families are brought into close contact without adequate water supplies, sewage disposal, or refuse disposal -- for example, in migrant labor camps, recreational campgrounds, and mobile home parks.

There are more than 1,000 mobile home parks in the state, accomodating about 120,000 mobile homes. Families residing in these parks are brought in close contact with each other, creating conditions where diseases attributable to unsanitary environment could spread rapidly. During 1978, about 40 parks did not meet minimum health and safety standards. Michigan also has about 1,000 campgrounds which if improperly constructed, maintained, or operated, could present similar potential health problems, with the hazard increased because of the sharing of common facilities.

Migratory workers bring many health problems with them when they come to the state to seek employment. This greatly magnifies the health risk of poor housing conditions. In 1978, there were 914 licensed migratory labor camps in Michigan for housing seasonal workers, providing space for 28,000 to 29,000 persons.

Impact of the problem

The impact of substandard living conditions is difficult to define because these conditions are closely linked with other health hazards of poverty -- poor nutrition, lack of access to care, and inadequate health knowledge, for

example. It is clear that the conditions described are responsible for the spread of communicable diseases, with their associated illness and cost effects. Lead paint, as noted, can cause illness, life-long disability, and even death when ingested by young children. Exposure to the cold contributes to excess mortality and morbidity from respiratory disease, and aggravates renal disease and circulatory problems. Cold, heat, or dampness aggravate various skin disorders. Overall, substandard living conditons increase the prevalence, impact and costs of many health problems.

Community concern about the problem

Communities become concerned about hazardous housing conditions if they perceive a threat to the general community -- for example, through the spread of communicable disease. Though many housing programs have been initiated in recent years, there are still segments of the population that are forced to live in conditions that are detrimental to their health. Though legislation sets many standards for aspects of living environments, resources and authority to enforce these standards have usually been limited. As noted in the discussion of water supplies, there has been concern in recent years about toxic chemicals in private water supplies. Users of campgrounds and other recreational facilities are concerned about sanitation and general environmental cleanliness, as much for esthetic reasons as for health reasons. Adequacy of housing is included in state and Health Systems Agency (HSA) health plans.

State legislation in the area of housing and living conditions dates back at least to 1917. Federal legislation in recent years has focused on this area as part of a general concern about environmental conditions. Federal legislation includes the Federal Safe Drinking Water Act (P.L. 93-523) and the Federal Water Pollution Control Act (P.L. 92-502). The new Public Health Code (Act 368, Part 122, Sections 12201-12222; Part 124, Sections 12401-12434; and Part 125, Sections 12501-12516) covers several areas related to housing and other living conditions. The Code provides for minimum health and safety standards for housing, minimum standards and licensing for agricultural labor camps, and the licensing of campgrounds in the state. The Department of Public Health has also promulgated rules regarding sanitation and safety standards for campgrounds. In addition, state and Federal statutes, rules and regulations establish minimum standards relating to licensed health-care facilities.

HEALTH SYSTEM PROBLEMS

Problems Related To Availability And Accessibility Of Services

Michigan has a comparatively well-organized health care system to serve its residents, despite the great complexity of the services that it offers. Through both public and private channels, adequate, high-quality health care is available. High-quality services are not uniformly available, however, and are sometimes not available to those most in need (Table 66).

Primary health care, for example, is fragmented or inadequate in many urban and rural areas throughout the state. As a result, appropriate and timely entry into the health care system is compromised. Within the the health care system, where separate and competing services are depicted as providing a freedom of choice, the fragmentation of care available from a spectrum of providers tends to result in an over-emphasis on the treatment of acute episodes of illness and injury rather than a more desirable continuum of care.

In addition, the quality and quantity of health care services available varies from one area of the state or health jurisdiction to another. Emergency services are not adequate in some areas to respond to needs caused by injuries, accidents, and certain illnesses such as cardiovascular illness.

Frequency or prevalence of the problem

It can be estimated on the basis of national statistics that about 10 percent of the population of Michigan, or almost a million people, experienced some problem in getting medical care during a given year (Table 67). The most frequent problem is a delay in getting an appointment (5.0 percent). Other frequent problems are finding a doctor available when needed (2.7 percent), cost (2.5 percent), inconvenient office hours (1.7 percent), lack of transportation (1.2 percent) or not knowing where to go (1.0 percent).

A higher percentage of those with low family income have been found to experience problems (14.2 percent), with cost, transportation, and lack of knowledge of where to go being more significant than for the population as a whole.

About 6 percent of the population, or 561,000 people in Michigan (based on national estimates), feel that they are not getting as much care as they need, the most frequent reason being the high cost of care (Table 68). A substantial portion feel that they are not getting the care they need because the doctor does not spend enough time with them; other reasons cited: not being able to get an appointment, difficulty in getting to a doctor, and inconvenient office hours.

It can be estimated that at least 1.3 million people in Michigan (14.9 percent of the population) do not have a particular doctor or place to which they go when they are sick or need advice about health (Table 69). More than half of

these people do not think that they need care (54.2 percent). Many of them (17.8 percent) see different doctors, depending on what is wrong, but do not have a regular or central source of care. However, based on national estimates, more than 100,000 persons in Michigan lack a source of care mainly because they are unable to find the right doctor; more than 100,000 have lost access to the doctor that was previously seen. An estimated 19.5 thousand people in the state lack a regular source of care because they find health care too expensive; others lack a regular source of care because they feel a facility is available if they need it (e.g., those on military bases or college students); or do not use doctors unless they are seriously ill.

These data indicate the dimensions of the problem of access, particularly, access to primary care. They suggest the extent of the problem created by fragmented or inadequate care, even for those who have access. A substantial portion of the population feels it does not need a source of regular care, or that care is needed only when seriously ill. Thus the problem of fragmented, inaccessible, or inadequate primary health care is closely related to problems of health knowledge and of orientation towards seeking care, as well as being a problem of resources in the health care system.

The problems noted above exist to some degree in all areas of the state. Some areas, however, are considered to be significantly underserved, or to have significant shortages of health care providers, according to criteria used in national health programs. The map in Figure 70 shows areas that have been identified as having a shortage of professional health personnel. In addition, even in areas that are adequately served, certain population groups find primary care inaccessible to them because of prejudice or cultural barriers.

The need for emergency service encompasses a broad range of causes of death and disability. Heart disease, stroke, and accidents cause more than 60 percent of all deaths in Michigan, and these problems frequently require emergency treatment. There were 347,751 traffic accidents in Michigan in 1977, many involving serious or critical injury. Motor vehicle traffic accidents cause about 45 percent of the accident-caused deaths. Approximately 2.8 million persons are treated in Michigan hospital emergency departments annually, and it is estimated that as many as one-third of them require urgent medical service.

In many areas of the state, however, efficient and effective emergency care is not available. In 1976, only 63 of the 83 Michigan counties met minimum standards for station-to-scene response time of emergency vehicles; 66 counties met minimum standards for vehicles per population. Minimum standards for available trained ambulance attendants were met by 81 of the 83 counties, but only 35 counties met standards for sufficient personnel to provide service 24 hours a day, seven days a week. Of 236 general hospitals in the state, almost all (211) provide emergency room service; however, only 154 are able to provide intensive care. Minimum standards for availability of intensive care units were met by 54 of the 83 counties.

Availability and accessibility of health care are also affected by the variation in public health services from one jurisdiction to another. These variations involve differences in the kinds and amounts of service available, as well as differences in the types of personnel providing services.

Impact of the problem

The lack of available, accessible, and coordinated care has two types of impact.

First is the inconvenience, loss of work time, anxiety, and frustration caused by problems such as difficulty in finding care, difficulty in obtaining a timely appointment, lack of appropriate providers, or lack of continuity of care.

The second type of impact is increased illness and disability when consumers are not able to obtain professional assessment of symptoms of illness, or when they resort to inappropriate self-medication and unqualified advisors. One indicator of this problem is the numberof hospital admissions for conditions which should have been managed, at a lesser level of severity, through ambulatory care. A major and costly problem is the use of emergency departments for primary health care by persons who lack access to appropriate ambulatory care.

Other indicators of the impact of this problem are suggested throughout the discussion of communicable disease, chronic disease, and other illness problems. The lack of access to preventive care, prompt attention to symptoms, or continuing management can result in unnecessary risk of communicable disease, or complications of illnesses such as hypertension, diabetes, or glaucoma.

The cost that can be attributed to this problem includes both the cost of lost work time, and the cost of specialized or inpatient medical services that could have been avoided if problems were managed at a less severe level.

A lack of effective and efficient emergency care results in unnecessary death or disability. Based on national estimates, 3 percent of all Michigan deaths, or more than 2,000, could be avoided if appropriate emergency care were obtained. Of the reported accidental deaths, national estimates indicate that 15 percent, or about 600, could be avoided. These estimates are confirmed by the judgement of Michigan emergency personnel. In addition to this life-or-death impact, the lack of good emergency service results in serious disability, sometimes necessitating lifelong care, or in disfigurement which affects daily life. The death or disability of family supporters also places an increased burden on public welfare.

Community concern about the problem

The problem of availability and accessibility of health care is one of the problems most widely perceived by consumers. It has become an issue of increasing concern, with newspaper articles on the topic, interest by con-

sumer groups, and the growth of training programs for pre-professional treatment of heart attack victims. The problem of access to primary care and deficiencies in the state's emergency medical system are included in state and Health Systems Agency (HSA) health plans.

This area has been addressed in major national and state legislation. Federal legislation includes P.L. 94-484, which seeks to increase medical service in areas where it is needed, and legislation to improve emergency services. In Michigan, the Public Health Code (Part 32, Sections 3201-32491; and Part 203, Sections 20301-20382) has as one of its aims the improvement of availability and accessibility of services. Under the Code the Department of Public Health is mandated to develop and administer a statewide emergency medical service system. The Code also provides for licensing and regulation of ambulances and ambulance personnel.

TABLE 66

HEALTH RESOURCES
NUMBER AND RATE OF HOSPITAL BEDS, ACTIVE PHYSICIANS, ACTIVE PRIMARY CARE PHYSICIANS, AND PUBLIC HEALTH EXPENDITURES

MICHIGAN AND UNITED STATES 1976

Population Estimates for 1976	Michigan 9,111,173		United States 213,000,000	
Resources	Number	Rate	Number	Rate
Hospital Beds[1]	38,419	42.17 (Per 10,000 population)	966,900	45.39 (Per 10,000 population)
Active Physicians[2]				
M.D.	10,889	11.95	318,089	14.93
D.O.	2,169	2.38 (per 10,000 population)	14,500	.68 (per 10,000 population)
Active Primary Care Physicians[3]				
M.D.	4,132	4.54	124,000	5.82
D.O.	1,081	1.19 (per 10,000 population)	n.a.	n.a. (per 10,000 population)
Public Health Expenditures[4]	$95 Million	$10.43 (Per Capita)	$3,232 Million	$15.17 (Per Capita)

[1]Acute care beds in non-federal general hospitals.
Source of Michigan data: "Health Facilities: Hospitals, Nursing Care Facilities, and Homes for the Aged, Michigan, 1976, "MCHIS Report Series, in press.
Source of U.S. data: "Health *United States, 1978," NCHS, December 1978, DHEW Pub. No. (PHS) 78-1232.

[2]Estimated number of active non-federal physicians.
Source of Michigan data: "Licensed Health Occupations, Michigan, Physicians 1976 (M.D. and D.O.), MCHIS Report Series.
Source of U.S. data: "Health *United States, 1978."

[3]Estimated number of active non-federal physicians. Includes physicians in general practice, family practice, pediatrics, and internal medicine.

[4]1976 expenditures through state health agencies.
Source: National Public Health Program Reporting System, Association of State and Territorial Health Officials.

TABLE 67

ESTIMATED NUMBER AND PERCENT OF PERSONS REPORTING ONE PROBLEM OR MORE IN GETTING MEDICAL CARE, AND ESTIMATED NUMBER AND PERCENT REPORTING SPECIFIC PROBLEMS

Problem	Percent of all persons (1)	Est. number in Michigan (2)	Percent of persons in low-income families (1)
Total population	100.0	9,358,000	100.0
One or more problems	10.4	973,000	14.2
Could not get appointment as soon as needed	5.0	467,900	5.1
No doctor available when needed	2.7	252,700	3.2
Cost	2.5	233,900	5.1
Office hours not convenient	1.7	159,100	1.7
Lack of transportation	1.2	112,300	3.6
Did not know where to go	1.0	93,600	1.3
Other reasons	0.5	46,800	0.7

(1) Based on data obtained in household interviews in the national Health Interview Survey conducted in 1974. Does not include institutionalized population. Low income = less than $5,000 family income.

(2) Percentage of the estimated Michigan population for 1980.

TABLE 68

ESTIMATED NUMBER AND PERCENT OF PERSONS REPORTING SELF-PERCEIVED UNMET HEALTH CARE NEEDS, AND ESTIMATED NUMBER AND PERCENT GIVING SPECIFIC REASONS

Reason	Percent of all persons (1)	Estimated number in Michigan (2)
Total population	100.0	9,358,000
Reporting unmet needs	6.0	561,480
All reasons	100.0	561,480
Cost	48.6	272,880
Doctor spends inadequate time	14.0	78,600
Cannot get appointment	13.8	77,500
Difficulty getting to doctor	8.3	46,600
Office hours inconvenient	6.5	36,500
Other reasons	26.5	148,800

(1) Based on data obtained in household interviews in the national Health Interview Survey conducted in 1974. Does not include institutionalized population.

(2) Percentage of the estimated Michigan population for 1980.

TABLE 69

ESTIMATED NUMBER AND PERCENT DISTRIBUTION OF PERSONS BY WHETHER OR NOT THEY HAVE A REGULAR SOURCE OF MEDICAL CARE, AND REASONS FOR LACKING A REGULAR SOURCE OF MEDICAL CARE

Reason	Percent of all persons (1)	Estimated number in Michigan (2)
Total population	100.0	9,358,000
With a regular source of care	80.5	7,529,000
Without a regular source of care	14.9	1,393,000
Information not available	4.7	436,000
All reasons	100.0	1,393,000
No doctor needed	54.2	755,000
See different doctors, dep. on problem	17.8	248,000
Unable to find right doctor	7.6	106,000
Previous doctor no longer available	7.5	104,000
Too expensive	1.4	19,000
Facility available if needed	1.1	15,000
Use doctors only if seriously ill	.2	2,000
Other reasons	8.2	114,000
Unknown	1.9	26,000

(1) Based on data obtained in household interviews in the national Health Interview Survey conducted in 1974. Does not include institutionalized population.
(2) Percentage of the estimated Michigan population for 1980.

FIGURE 70

HEALTH MANPOWER SHORTAGE AREAS

MICHIGAN JUNE, 1979

Source: Bureau of Personal Health Services,
Michigan Department of Public Health.

Maldistribution Of Health Professionals

The lack of available and accessible trained health professionals is a major health system problem in some areas of the state, and is a factor which contributes to other problems such as the availability of primary services. In some health occupations, the number of available trained professionals is not sufficient to meet the state's needs, while in other occupations, although there is no overall shortage of professionally trained persons, their uneven distribution results in local shortages. Among physicians, there is a further maldistribution among specialties which also contributes to the problem.

Problems of maldistribution, some of which have been noted in relation to other problems, are:

- A shortage of physicians in some areas, mainly rural
- A shortage of primary care physicians, and an oversupply in some specialties
- Lack of trained emergency medical technicians in many areas
- Shortage of health professionals with public health training
- Lack of personnel with training in environmental health
- Lack of adequately trained personnel to provide home health services.

Frequency or prevalence of the problem

Large portions of Michigan's population live in areas which, by various standards, have a shortage of primary health care providers and other trained health professionals. Licensed health professionals are clearly distributed unevenly throughout the state.

For 13 of the licensed occupations, Table 72 gives the estimated number of active professionals and an "index of availability" for each of the Health Service Areas of the state, and for three large counties in Southeast Michigan.

The index is based on ratios of professionals to population, and compares the ratio for the area to the ratio for the state as a whole. An index greater than one shows that an area has proportionally more professionals than the state as a whole in relation to population size; an index less than one shows that there are fewer professionals than for the state as a whole. The variation in distribution of professionals is apparent, and indicates probable shortages in at least some of the state. Whether or not there is actually a shortage depends, of course, on factors related to need: the economic status of the population, proportion of aged residents, the general health status of the population, and the proportion of persons with chronic conditions requiring extended care. The adequacy of services also depends on the availability of well-trained allied health personnel, the adequacy of facil-

ities, and the proportion of professionals in training, research, or administration, rather than direct patient care.

The federal government has designated some areas of the state as health manpower shortage areas (Figure 70). These areas account for approximately 9 percent of the state's population. This designation, however, is made only for regions which request such a designation. Thus, it may omit areas which did not request designation or were not below the physician/population standards, even though these areas may be experiencing a health manpower shortage. Regions in the state may also be designated as medically underserved. The areas currently designated as medically underserved include approximately 5.8 percent of the state's population. Designations of health manpower shortage areas and medically underserved areas are based principally on provider/population ratios, but take into account other factors as well.

Physicians may also be poorly distributed among the specialty areas. In 1978, there was an estimated total of 13,858 active physicians in the state; of these 48.7 percent were in primary care specialties (Table 71). Southeast Michigan, with about 52 percent of the state's population, had 60.3 percent of all primary care specialists, while the Upper Peninsula, with 3.6 percent of the state's population, had 2.2 percent of the primary care specialists.

Public health departments depend on personnel with professional public health training, and, in particular, look toward the public health trained physician for leadership. As of January 1, 1978, however, only 29 of the 47 local health jurisdictions in Michigan were served by medically-trained local health officers and only 12 of these health officers were doctors with a graduate degree in public health. An intensive effort by both the Department of Public Health and the local health jurisdictions has failed to attract a sufficient number of new public health physicians.

Problems of shortages and maldistribution also exist for allied health professionals. Lack of trained emergency medical technicians in many areas, particularly in rural areas of the state, leads to unnecessary mortality and morbidity, increasing the severity of the impact of accidents and heart attacks, and creating an increased need for more highly trained professionals. The lack of sufficient home health services results in unnecessary use of long-term care facilities and staff.

Impact of the problem

The impact of health professional shortages and maldistribution is similar to that of problems of availability and accessibility of resources. Lack of available primary care specialists may result in delayed treatment for individuals, or increased pain and suffering for conditions that may go untreated. Increased work loss and the need to travel long distances for

medical treatment may also occur. Inappropriate use of higher-cost specialists to provide primary care or use of emergency room facilities and personnel for primary care services often results from the lack of available primary care physicians. Lack of trained home health care personnel may result in unnecessary institutionalization for the individual. Lack of trained emergency services personnel results in increased risk of death or disability for the individual involved in an accident or requiring emergency treatment for a heart attack or other acute condition.

For the community, the impact of a maldistribution of health professionals is chiefly in increased cost for health care. These costs result from inappropriate use of health resources, increased disability and work loss due to inadequately treated medical needs, and emphasis on crisis-oriented rather than preventive medicine, and the need for increased travel time to obtain medical treatment. Lack of adequate health professionals may also deter people from settling in a community. Lack of trained public health physicians decreases the effectiveness of the community's public health program.

Community concern about the problem

The problem of maldistribution of health professionals has been addressed at both the federal and state level, as well as being the subject of press coverage and local concern, particularly for communities with a lack of physicians. Problems related to health personnel resources and emergency medical services personnel are included in state and Health Systems Agency (HSA) health plans.

Extensive state and federal legislation has been passed in this area, including the National Health Planning and Resources Development Act. The state of Michigan supports Family Practice Residency programs in about 15 communities, to increase the supply of family doctors. The new Public Health Code (Act 368 P.A. 1978) calls for training for emergency medical services personnel. The Federal government has set up the National Health Service Corps to provide scholarships for medical students in exchange for an agreement to practice for a specified length of time in a designated shortage area. The College of Human Medicine at Michigan State University has also developed a program to train medical students in the Upper Peninsula, in order to increase the likelihood of their practicing in the area.

TABLE 71

ESTIMATED NUMBER AND PERCENT OF ACTIVE PHYSICIANS AND ACTIVE PRIMARY CARE PHYSICIANS, AND PERCENT OF ACTIVE PHYSICIANS IN PRIMARY CARE IN MICHIGAN, BY HEALTH SERVICE AREA, 1978

(Estimates and percent distributions of physicians are based on survey responses only.)

Physicians	Mich.	Health Service Area							
		South-East (I)	Mid-South (II)	South West (III)	West (IV)	GLS[3] (V)	East Central (VI)	North Central (VII)	Upper Peninsula (VIII)
Percent of Total State Population	100.0	51.72	7.41	8.26	11.26	6.30	8.18	3.28	3.59
Active Physicians[1]									
Number	13,858	8,666	865	926	1,258	732	735	410	266
Percent	100.0	62.5	6.2	6.7	9.1	5.3	5.3	3.0	1.9
Active Primary Care Physicians[2]									
Number	6,751	4,074	457	471	621	375	399	200	152
Percent	100.0	60.3	6.8	7.0	9.2	5.6	5.9	3.0	2.2
Percent of Active Physicians in Primary Care Specialties	48.7	47.0	52.9	50.9	49.4	51.2	54.3	48.9	57.4

[1] M.D.s and D.O.s

[2] Includes family practice, general practice, internal medicine, pediatrics, obstetrics and gynecology specialties.

[3] Genesee, Lapeer, Shiawassee

Source: Annual survey of licensed health occupations conducted by the Michigan Department of Public Health and the Department of Licensing and Regulation.

TABLE 72

ESTIMATED NUMBER OF ACTIVE PROFESSIONALS, AND INDEX OF AVAILABILITY
BY HEALTH SERVICE AREA, FOR SELECTED PROFESSIONS

MICHIGAN 1977-1978

Health Service Area	Estimated Population	Profession									
		Chiropractors		Dental Hygienists		Dentists		LPN, LPAN's		Nursing Home Administrators	
		Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index
Michigan	9,129,000	797	1.00	2,409	1.00	4,862	1.00	20,364	1.00	632	1.00
Southeast (Area 1)	4,685,000	331	.81	1,227	.99	2,770	1.11	8,661	.83	306	.94
Macomb	*686,000*	*42*	*.70*	*177*	*.98*	*388*	*1.06*	*729*	*.48*	*23*	*.48*
Oakland	*984,200*	*63*	*.73*	*394*	*1.52*	*764*	*1.46*	*1,553*	*.71*	*65*	*.95*
Wayne	*2,417,700*	*165*	*.78*	*481*	*.75*	*1,192*	*.92*	*5,132*	*.95*	*182*	*1.09*
Mid-South (Area 2)	682,000	72	1.21	223	1.24	336	.92	1,421	.94	43	.91
Southwest (Area 3)	752,500	91	1.38	209	1.05	349	.87	1,811	1.08	52	1.00
West (Area 4)	1,040,700	124	1.36	259	.94	531	.96	2,931	1.26	82	1.14
GLS[1] (Area 5)	578,900	52	1.03	191	1.25	239	.78	1,618	1.25	34	.85
East Central (Area 6)	752,200	62	.94	172	.87	316	.79	1,880	1.12	58	1.11
North Central (Area 7)	305,800	35	1.31	77	.95	167	1.02	1,051	1.54	20	.94
Upper Peninsula (Area 8)	332,200	30	1.03	51	.58	154	.87	984	1.33	37	1.61

[1]Genesee, Lapeer, Shiawassee

TABLE 72

ESTIMATED NUMBER OF ACTIVE PROFESSIONALS, AND INDEX OF AVAILABILITY BY HEALTH SERVICE AREA, FOR SELECTED PROFESSIONS

MICHIGAN 1977-1978

(Cont.)

Health Service Area	Profession											
	Optometrists		Pharmacists		Physicians[2]		Physical Therapists		Podiatrists		Psychologists		Registered Nurses	
	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index	Est. No. Active	Index
Michigan	849	1.00	5,830	1.00	13,858	1.00	929	1.00	350	1.00	1,317	1.00	40,255	1.00
Southeast (Area 1)	402	.92	3,094	1.03	8,666	1.22	518	1.09	242	1.35	718	1.06	21,105	1.02
Macomb	*68*	*1.06*	*383*	*.83*	*684*	*.66*	*41*	*.59*	*46*	*1.74*	*42*	*.42*	*1,815*	*.60*
Oakland	*112*	*1.22*	*705*	*1.12*	*2,224*	*1.49*	*139*	*1.39*	*62*	*1.64*	*263*	*1.85*	*4,388*	*1.00*
Wayne	*180*	*.80*	*1,612*	*1.04*	*4,372*	*1.19*	*234*	*.95*	*123*	*1.33*	*264*	*.76*	*11,732*	*1.10*
Mid-South (Area 2)	64	1.01	382	.88	865	.84	63	.91	15	.57	129	1.31	2,925	.95
Southwest (Area 3)	79	1.13	488	1.02	926	.81	68	.89	19	.66	113	1.04	3,644	1.10
West (Area 4)	113	1.17	660	.99	1,258	.80	110	1.04	28	.70	143	.95	4,324	.94
GLS[1] (Area 5)	61	1.13	365	.99	732	.83	60	1.02	17	.77	62	.74	2,590	1.01
East Central (Area 6)	61	.87	436	.91	735	.64	52	.68	14	.48	96	.88	2,949	.89
North Central (Area 7)	41	1.44	237	1.21	410	.88	23	.74	7	.60	33	.75	1,334	.99
Upper Peninsula (Area 8)	28	.91	167	.79	266	.53	35	1.04	8	.63	23	.48	1,384	.94

[1] Genesee, Lapeer, Shiawassee

[2] M.D.'s and D.O.'s

Problems Of Cost, Quality Control, And Appropriate Use Of Resources

Unnecessary duplication of facilities and services, as well as a lack of effective utilization control, has contributed to the escalation of health care costs. The inappropriate use of resources, partly due to a lack of knowledge and partly due to a lack of more appropriate alternatives, also results in increased costs. Quality of care has been compromised by excessive utilization as well as the lack of recognized and effective surveillance programs. Overlapping, conflicting, or fragmented federal programs, and to some extent state programs as well, lead to inefficient use of resources and counterproductive administrative procedures in the delivery of services.

Frequency or prevalence of the problem

During the fiscal year ending September, 1977 the amount spent for health care in the United States totaled $162.6 billion or 8.8 percent of the gross national product. This total health expenditure was 12 percent greater than the previous year, and amounted to $737 per person. Using the national average, the total spent for health care in Michigan can be estimated at $5.8 billion.

One indicator of increases in public costs of health in Michigan is the money allocated to public health, mental health, and medical assistance (Medicaid). The total amount recommended for these programs in 1978-79 is more than $1.5 billion, with 60 percent of the amount earmarked for Medicaid (Table 73).

Utilization of health facilities and related institutional care far exceeds accepted norms. National guidelines for acute care hospital resources recommend 1000 patient days of care per 1000 population as reasonable use of these facilities; in 1976, Michigan residents experienced close to 1200 patient days of care per 1000 population. It is estimated that there are about 5,000 surplus hospital beds in Michigan, including both underused beds and inappropriately used beds. Estimates have been made that the average cost of maintaining an unused hospital bed is $20,000 per year. On this basis, a cost of 100 million dollars can be conservatively attributed to excess hospital beds in Michigan alone.

Inappropriate use of services by consumers is exemplified by use of emergency rooms throughout the state for primary medical care. On the basis of national statistics, it is estimated that about 4,600 persons in Michigan use emergency rooms as their place of regular ambulatory care. Many more use these facilities intermittently for care that could be provided in less expensive facilities, because of their inability to obtain ready access to a physician.

Other examples of inappropriate use of resources are the use of inpatient hospital facilities for care which could be provided on an outpatient or less intensive inpatient basis, and the use of nursing care facilities for long-term supportive living by persons who do not need medical service.

For services in physicians' offices, research has shown that insurance coverage tends to increase the number of services provided per physician visit, and leads to separate billing for individual procedures, rather than including the procedures in the overall fee. These practices for example, affect the cost of the Medicaid program which, in Michigan, includes 27,000 providers serving 960,000 Medicaid recipients, with about 60,000 invoices received per day and an $800 million annual expenditure.

Many members of the population seek care from specialists for problems that might better be evaluated by primary care physicians, while a small segment of the population (.2 percent according to the National Health Interview Survey) seeks medical care only when seriously ill. Both of these examples represent misuse of resources.

Increasing use of high-level technology has also contributed to the rising costs of health care. For example, in Michigan there were 167 organ transplants and 3.6 thousand open heart surgery procedures performed in 1977; there were 27 facilities providing inpatient kidney dialysis, and 16 facilities with computerized axial tomography (CAT) scanners. Although there is no question about the health benefits of many technological advances, there are some procedures or devices whose effectiveness has not been demonstrated, and in many cases, high-level technology is utilized where less expensive procedures would suffice. Throughout the country, including Michigan, there is concern about excess purchases of CAT scanners, and it is suspected that they are used unnecessarily in order to make the purchase of the machines profitable. CAT scanners cost between $350,000 and $600,000 each, with an added cost for performing scans. The cost of excess duplication and unnecessary use has not been defined; however, the average payment per scan is over $200.

The prevalence of substandard quality is difficult to measure because of the fragmentary nature of existing quality control mechanisms. Of the more than 800 licensed health facilities in the state, more than 160 nursing homes and 30 hospitals have been closed in recent years for failure to comply with minimum standards.

Impact of the problem

The rising costs of health care have an impact on the economic life of every person in the state, because of both the increase in direct expenditures by consumers (Table 74), and the increase in tax burden for publicly supported programs.

Nationally, the amount spent on personal health care has increased yearly, and is now about 8.8 percent of the Gross National Product. The greatest increase has been in the area of hospital care. Public spending has outdistanced private spending over the last twenty years because of Medicaid and Medicare, adding to both state and federal income taxes.

Problems of quality of care similarly have an impact on almost all persons in the state. Inappropriate treatment or care causes unnecessary disability or illness. Substandard care in some nursing homes, affecting in particular the aged population, is marked by a lack of social and rehabilitative services as well as poor medical and nursing services.

The problem of health care costs has an impact on productivity of the community in that excess resources devoted to health care could be applied to other areas of capital development or services.

Lack of knowledge about use of services, poor organization, lack of appropriate alternatives, and substandard quality of care contribute to increased illness and disability, affecting the quality of life in the community, and contributing further to the increase in expenditures for care.

Community concern about the problem

Strong interest in these problems has been expressed by both labor unions and consumer interest groups, as well as major industry representatives. Cost containment and quality assurance are included in state and Health Systems Agency (HSA) health plans.

Cost containment and quality assurance are primary goals in both state and federal legislation. Federal legislation includes the National Health Planning and Resources Development Act. The new Public Health Code (Act 368, Article 17) also addresses these issues. This legislation provides for Certificate of Need requirements and the licensing and regulation of health facilities.

TABLE 73

STATE EXPENDITURES FOR HEALTH-RELATED SERVICES

MICHIGAN 1976-79

	Expenditures (Millions)		
	1976-77	1977-78	1978-79
Public Health	120.7	147.1	154.9
Mental Health	328.3	411.5	456.6
Medical Assistance (Medicaid)	810.8	908.7	916.8
Total	1,259.8	1,467.3	1,528.3

Source: Budget Messages of the Governor for the Fiscal Year 1977-78, and 1978-79, State of Michigan.

TABLE 74

ANNUAL PERCENT CHANGE IN CONSUMER PRICES FOR MEDICAL CARE SUBGROUPS:

AVERAGE FOR SELECTED U.S. CITIES[1] AND DETROIT METROPOLITAN AREA

DECEMBER 1968 - DECEMBER 1976

(DATA ARE BASED ON REPORTING BY SAMPLES OF PROVIDERS AND OTHER RETAIL OUTLETS)

Medical Care Subgroup	Year							
	Dec.'68-Dec.'69	Dec.'69-Dec.'70	Dec.'70-Dec.'71	Dec.'71-Dec.'72	Dec.'72-Dec.'73	Dec.'73 Dec.'74	Dec.'74 Dec.'75	Dec.'75-Dec.'76
U.S. City Average								
Medical Care	6.0	7.4	4.8	3.3	5.2	12.4	9.9	10.1
Med. Care Serv.	7.1	8.3	5.3	3.8	5.8	13.3	10.3	10.7
Phys. Fees	7.3	8.1	5.2	2.4	4.0	13.3	11.8	9.7
Dent. Fees	7.5	5.6	6.4	2.8	3.7	11.4	7.8	6.8
Hosp. Daily Serv. Charges	12.0	13.5	8.9	-	4.3	14.2	13.0	11.4
Drugs & Prescr.	1.1	2.4	1.3	0.0	0.7	6.9	7.4	5.7
Detroit Metro. Area								
Medical Care	6.6	10.3	7.0	4.1	6.8	12.0	14.3	11.0
Med. Care Serv.	7.1	10.9	7.3	4.4	7.6	11.8	15.1	11.5
Phys. Fees	8.0	7.7	5.7	1.0	6.0	11.7	15.8	7.6
Dent. Fees	6.1	13.8	9.4	1.1	2.0	17.8	10.4	12.6
Hosp. Daily Serv. Charges	13.3	22.8	11.8	-	3.8	8.0	20.3	12.6
Drugs & Prescr.	2.1	5.2	3.8	1.4	-1.3	14.8	5.7	5.0

[1]Atlanta, Baltimore, Chicago, Detroit, Los Angeles, New York, Philadelphia, St. Louis, San Francisco.

Source: Bureau of Labor Statistics, Department of Labor, Selected Data from the Consumer Price Index.

Lack Of Information To Support Decision-Making

In many aspects of health planning, health service development, service delivery, and evaluation, there is a lack of sufficient information to guide actions and allocation of resources. The lack of information is due to several factors: lack of data about the health or health service issue, lack of analytical methods for making optimal use of available data to address the issues, lack of sufficient personnel with training and experience in appropriately assembling and presenting data, and lack of timeliness in the availability of data related to issues which need immediate response.

Frequency or prevalence of the problem

The lack of sufficient information is associated with, or contributes to, many of the health problems cited in this report.

a. There is a lack of information about the prevalence of chronic illness and disability in the population of Michigan, and about environmental and behavioral factors to which these problems might be related. Inferences have been based on mortality data, some hospitalization data, and extrapolation from national surveys. In particular, there is no method of linking chronic illness to occupational and other environmental factors.

b. There is a lack of capability for disease and disability investigation and surveillance, including laboratory diagnosis, within a time frame that would allow appropriate control or preventive measures to be instituted, for problems where such intervention would be effective.

c. There is a lack of sufficient information for the planning, development, or allocation of health care resources such as inpatient and outpatient facilities, health professionals, and major technological devices. Needs determination is probably the most crucial area where improved methods of analysis could improve decision-making, especially where projection of future needs is required. There are some population groups, such as the aged, whose needs are only fragmentarily defined.

e. There is a lack of comprehensive information about the prevalence of known harmful substances in the environment, coupled with a lack of information about human interaction with these substances, such as extent of their presence in food, water supplies, and living environments.

f. Basic scientific information, requiring research, is lacking in many health related areas. Areas of particular research concern are dose-rate effects of toxic substances in the environment, and effectiveness of behavior modification strategies.

Impact of the problem

The lack of information has an impact on the health of people in the state, on the availability of resources, and on the costs of health care. First, with better knowledge of the prevalence of illnesses, and the factors related to chronic illness, and with more timely information about unexpected or acute problems through community surveillance, actions for prevention or control might be initiated. Secondly, with better projection of needs for resources and services, development of unnecessary facilities and programs could be avoided, and, once problems have been identified, resources and services could be focused where they would have the greatest benefit.

The lack of information about the relation of environmental factors to the general health of the population, and the many research questions that are unresolved, may also have resulted in unnecessary restrictions on industry and agriculture, adding to the overall cost of living and to unemployment.

Community concern about the problem

The gaps in information about morbidity, and about projected needs for services or resources, are more the concern of the government and the health industry, rather than being a concern of the general community. Although there is community concern about data on contamination of the environment, the concern tends to focus on episodes of a crisis nature, instead of on general prevalence and effect of contamination.

Health professionals at the national, state, and local levels, both government and private alike, have expressed concern about lack of data. The federal government has established the Cooperative Health Statistics System, to provide a more efficient mechanism for collection and dissemination of general-purpose data, and to make these data more readily available to state and local users. In addition, there is a growing interest in utilizing recordkeeping systems for statistical purposes, as is evidenced in the recommendation, by the National Committee on Vital and Health Statistics, for uniform minimum data sets to be included in patient records of hospital care, ambulatory care, and long-term care.

At the state level, evidence of concern includes state support of the Cooperative System in Michigan, support of the development of a cancer reporting system, an increasing number of requests for data by planners and administrators, and an increase in staffing for analysis and presentation of information in many agencies. Under the new Public Health Code (Act 368, Sections 2601-2641), the Department of Public Health is mandated to establish a comprehensive health information system for the state.

Inadequate Health Knowledge

The detrimental effects of inadequate health knowledge are apparent throughout the discussion of all the other health problem areas, affecting the health status of the population and having implications for the behavior, lifestyle, and environmental concerns of the state's residents. Inadequate health knowledge also influences other problems of the health system, such as high costs of health care and the inappropriate use of health resources.

Frequency or prevalence of the problem

Every resident of Michigan is affected by at least some aspects of the inadequacy of health knowledge, either directly, through impact on his or her own health, or through the impacts on the community such as the increased public cost of medical care.

The following discussion highlights those health problems, previously discussed, in which the frequency, prevalence, or impact is partly a result of the lack of health knowledge.

- Prevention and control of disease:
  Inadequate knowledge about prevention and control of disease results in unhealthy life styles, or lack of appropriate care, which contribute to illness and disability. Behavior which is harmful to health, such as poor diets, lack of exercise, and misuse of drug-like substances (tobacco, alcohol, coffee, sleeping pills) result from inadequate knowledge, as well as from a lack of motivation. (See section on health behavior.) Lack of knowledge and motivation contribute to the frequency of vaccine-preventable communicable disease, with the lack of motivation partly a result of parents' perception of these illnesses as not being serious. Other communicable diseases are more widespread than they need be because of lack of knowledge about hygienic measures to avoid contaminating others--for example, ways to avoid spreading common respiratory diseases, or venereal diseases.

  Many persons with chronic illness lack knowledge about proper self-management such as the need for special diet, exercise, or medications. There is inadequate knowledge of the health measures that are necessary after a stroke or heart attack, or in the non-symptomatic stages of diabetes and hypertension, which results in increased disability and need for more professional care.

- Pregnancy and infant care:
  Some of the problems of pregnancy, infancy, and early childhood are exacerbated by parents' lack of knowledge about self-care for pregnant women, proper infant feeding and handling, and appropriate care of young children. The problems of births to very young mothers, and frequent pregnancy, are partly a result of lack of knowledge about sexuality and methods of pregnancy control. By their reluctance to have children informed about sex and sex behavior, parents transmit their own lack of knowledge to their children.

- Control of environmental problems:
  Inadequate knowledge is also evident in many areas of environmental concern. Lack of knowledge or motivation results in inadequate sanitation in the home; for example, improper disposal of waste increases rodent and insect infestation. Toxic chemicals such as insecticides and household cleansers are misused or mishandled, and thus contaminate the environment. There may be improper food storage and management in the home, and even food service personnel are sometimes not aware of basic principles of sanitation. Among the work force, managers and supervisors may not be able to recognize hazardous situations, and may lack knowledge about basic controls and precautions to avoid occupational disease and accidents.

- Use of health care resources:
  Inadequate knowledge also results in inappropriate use of health care resources, resulting in higher health care costs and increased disability and illness. Many persons do not seek medical care unless they feel they are seriously ill; thus they receive neither preventive care and screening, nor counseling on the management of chronic illness in its early stages. Use of primary care is sometimes impeded by lack of knowledge about where and how to seek care or what types of resources are appropriate. (See section on availability and accessibility of services.) Providers and consumers alike are often unaware of the true costs of medical services being used, and, as a result, consume more than is warranted and contribute to the overall high costs of health services.

There is a lack of knowledge about the side effects of medications, the results of combining medications, and the inappropriateness of various over-the-counter drugs; this results in increased illness due to improper medication or adds severe discomfort to existing illnesses. Finally, consumers are not well enough informed to judge the quality of the care they are receiving, or to contribute effectively to the process of diagnosis.

Impact of the problem

Lack of knowledge increases the frequency, prevalence, or seriousness of each of the problems discussed above, and thus contributes to the impacts described for each problem. The principal types of impact are: increased disability, morbidity, and mortality; and increased cost of health and medical care.

Community concern about the problem

Community concern is apparent because of the strong pressures for health education. The new Public Health Code (Act 368, P.A. 1978) requires the Department of Public Health to develop a health education program. The State Health Plan addresses the problem of inadequate health education. Books providing information about diet, exercise, self-care for illness, uses and effects of medication, and child care have become popular and may even be best-sellers.

REFERENCES USED

A. References used in several parts of the report

1. 1977 Program Budget Statement, Michigan Department of Public Health, Maurice S. Reizen, M.D., Director, Oct., 1977.

2. 1978 Program Budget Statement, Michigan Department of Public Health, Maurice S. Reizen, M.D., Director, Oct., 1978.

3. Budget Message of the Governor for the Fiscal Year 1977-78, State of Michigan, issued Jan., 1977.

4. Budget Message of the Governor for the Fiscal Year 1978-79, State of Michigan, issued Jan., 1978.

5. Executive Budget, Fiscal Year 1977-78, State of Michigan, issued Jan., 1977.

6. Executive Budget, Fiscal Year 1978-79, State of Michigan, issued Jan., 1978.

7. "Michigan Health Statistics: Annual Statistical Report 1975," Michigan Department of Public Health, Office of Vital and Health Statistics.

8. "Michigan Health Statistics: Annual Statistical Report 1976," Michigan Department of Public Health, Office of Vital and Health Statistics.

9. Population Projections for Michigan to the Year 2000, Michigan Department of Management and Budget, Information Systems Division, Office of the Budget, issued April, 1978.

10. "Preliminary State Health Plan for Michigan 1979-1983 (Draft)," prepared by the Office of Health and Medical Affairs, Lansing, Michigan.

11. "Prevention in Action: Annual Report 1976, Early and Periodic Screening, Diagnosis and Treatment Program," Michigan Department of Public Health, Bureau of Personal Health Services and Michigan Department of Social Services, Bureau of Medical Assistance.

12. "Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program, Annual Report, 1977," Michigan Department of Public Health, Bureau of Personal Health Services and Michigan Department of Social Services, Bureau of Medical Services Administration.

13. "Health Facilities: Hospitals, Nursing Care Facilities, and Homes for the Aged, Michigan 1976," Michigan Cooperative Health Information System (MCHIS) Report Series, in preparation, Michigan Department of Public Health, Office of Statistics Research and Evaluation.

14. "Health Facilities: Hospitals, Nursing Care Facilities, and Homes for the Aged, Michigan 1977," Michigan Cooperative Health Information System (MCHIS) Report Series, in preparation, Michigan Department of Public Health, Office of Statistics Research and Evaluation.

REFERENCES (continued)

15. "Health in Michigan: A profile, 1973-1974," Michigan Department of Public Health, Center for Health Statistics.

16. "Health in the United States, 1976, A Chartbook," National Center for Health Statistics, DHEW Pub. No. (HRA) 76-1233.

17. "Health * United States * 1976-1977," National Center for Health Statistics, DHEW Pub. No. (HRA) 77-1232.

18. "Health * United States, 1978," National Center for Health Statistics, DHEW Pub. No. (PHS) 78-1232, Dec., 1978.

19. "State Estimates of Disability and Utilization of Medical Services: United States, 1974-76," National Center for Health Statistics, DHEW Pub. No. (PHS) 78-1241.

20. "Utilization of Short-Stay Hospitals," Vital and Health Statistics: Series 13, No. 37, National Center for Health Statistics, DHEW Pub. No. (PHS) 78-1788.

21. Vital Statistics of the United States, 1975, Vol. 1, National Center for Health Statistics, DHEW.

22. "Current Estimates From the Health Interview Survey, United States, 1974," Vital and Health Statistics: Series 10, No. 100, DHEW Pub. No. (HRA) 76-1527.

23. "Current Estimates from the Health Interview Survey: United States, 1977," Vital and Health Statistics: Series 10, No. 126, National Center for Health Statistics, DHEW Pub. No. (PHS) 78-1554.

24. Advance Data from Vital and Health Statistics, National Center for Health Statistics, No. 17, "Access to Ambulatory Health Care: United States, 1974," DHEW Pub. No. (PHS) 78-1250, issued Feb. 23, 1978.

25. Advance Data from Vital and Health Statistics, National Center for Health Statistics, No. 48, "1977 Summary: National Ambulatory Medical Care Survey," DHEW Pub. No. (PHS) 79-1250, issued April 13, 1979.

26. "Medicare: Inpatient Utilization of Short-Stay Hospitals, by Diagnosis, 1973," Research and Statistics Note, No.3, DHEW, Health Care Financing Administration, Office of Policy, Planning, and Research, June, 1978.

27. "Recommendations For A National Strategy For Disease Prevention," Center For Disease Control, Programs and Policies Advisory Committee (Ad Hoc), DHEW, June 30, 1978.

28. Conn, Howard R., M.D. Current Therapy 1977, W.B. Saunders Co., Philadelphia, 1977.

29. "New HEW Report Reveals Status of Nation's Health," Michigan Medicine, Vol. 77, No. 2, Jan., 1978.

B. Additional References, Communicable Disease Problems

30. Weekly Surveillance Reports, Michigan Department of Public Health, Bureau of Disease Control and Laboratory Services, Division of Epidemiology.

31. Auerback, Stuart, "Virus Akin to Cold Sores," The Washington Post - Outlook, Nov. 16, 1975.

32. Blakeslee, Alton, "Some Treatment For Our National Stomachache," The Detroit Free Press, Dec. 6, 1977.

33. Control of Communicable Diseases in Man, American Public Health Association, New York, 1970.

34. Kaufman, Raymond H., "Clinical Features of Herpes Genitalis," The Female Patient, April, 1977.

35. "Disease Center Fears Cases of TB are Unreported," New York Times, Feb. 9, 1979.

36. "Three Little-Known Venereal Diseases Reported Becoming Major Threat," New York Times, February 20, 1979.

37. "Recommendation of the Public Health Service Advisory Committee on Immunization Practices," Morbidity and Mortality Weekly Report, Center for Disease Control, DHEW, Vol. 26, No. 40, Oct. 7, 1977.

C. Additional References, Chronic Illness

38. "Blood Pressure Levels of Persons 6-74 Years, United States, 1971-1974," Vital and Health Statistics: Series 11, No. 203, National Center For Health Statistics, DHEW, Pub. No. (HRA) 78-1648.

39. "Cardiovascular conditions of children 6-11 years and youths 12-17 years, United States, 1963-1965 and 1966-1970," Vital and Health Statistics: Series 11, No. 166, National Center For Health Statistics, DHEW Pub. No. (PHS) 78-1635.

40. "Comprehensive NPHPRS Report: Services, Expenditures and Programs of State and Territorial Health Agencies, Fiscal Year 1977," Health Program Reporting System, The Association of State and Territorial Health Officials, May, 1979.

41. Colata, Gina Bari, "Obesity: A Growing Problem," Science, Vol. 198, No. 4320, Dec. 2, 1977, pp. 905-906.

42. Godley, F. and Kruegel, D.L., "Cigarette Smoking and Differential Mortality: New Estimates from Representative National Samples," paper presented at the annual meeting of the Population Association of America, Seattle, April, 1975.

43. Gori, Gio B. and Richter, Brian, "Macroeconomics of Disease Prevention in the United States," Science, Vol. 200, No. 4346, June 9, 1978, pp. 1124-1130.

44. Granieri, Samuel; Burton, Wayne; and Webster, James R. Jr., "Tobacco, Health and the Physician," Editorial, Journal of Chronic Disease, Vol. 3, No. 8, 1978, pp. 499-500.

45. Haire, Henry; Sherrard, Donald: Scardapane, Donna: Curtis, F. Kingsbury; and Brunzell, John. "Smoking, Hypertension, and Mortality in a Maintenance Dialysis Population," Cardiovascular Medicine, Vol. 3, No. 4, Nov., 1978, pp. 1163-1166.

46. "The Impact, Costs, and Consequences of Catastrophic Illness on Patients and Families," A Report of a Social Research Study of Selected Families Stricken by Advanced Cancer by Cancer Care, Inc. and the National Cancer Foundation, Inc., March, 1973.

47. Marx, Jean L., "Stress: Role in Hypertension Debated," Science. Vol. 198, No. 4320, pp. 905-907.

48. Sparrow, David; Dawber, Thomas; and Colton, Theodore, "The Influence of Cigarette Smoking on Prognosis after a First Myocardial Infarction," Journal of Chronic Diseases, Vol. 31, No. 6/7, 1978, pp. 425-432.

D. Additional References, Problems of Pregnancy, Birth and Development

49. "Perinatal Mortality by Hospital of Birth: Michigan 1970-1977," Michigan Department of Public Health, Office of Vital and Health Statistics.

50. "Congenital Anomalies and Birth Injuries Among Live Births: United States, 1973-74," Vital and Health Statistics: Series 21, No. 31, National Center For Health Statistics, DHEW Pub. No. (PHS) 79-1909.

51. "Characteristics of Births, United States, 1973-1975," Vital and Health Statistics: Series 21, No. 30, National Center For Health Statistics, DHEW Pub. No. (PHS) 78-1908.

52. "Wanted and Unwanted Childbearing in the United States, 1968, 1969, and 1972 National Natality Surveys," Vital and Health Statistics: Series 21, No. 32, National Center For Health Statistics, DHEW Pub. No. (PHS) 78-1918.

53. Epstein, Charles and Golbus, Mitchell, "Prenatal Diagnosis of Genetic Diseases," American Scientist, Vol. 65, No. 6, Nov.-Dec., 1977, pp. 703-711.

54. Holden, Constance, "Teen-Age Pregnancies Out of Control," Science, Vol. 204, No. 11, May, 1979, p. 597.

55. News article on cost of saving the life of low birth-weight infants; result of research at Cedars - Sinai Medical Center, Los Angeles.

56. Powers, Jane V., "Adolescent Health Care Services in Michigan," Michigan Department of Public Health, Bureau of Personal Health Services, April, 1978.

E. Additional References, Mental and Emotional Health Problems

57. "Michigan State Developmental Disabilities Plan," Fiscal Year 1977-78, Michigan State Planning Council for Developmental Disabilities and Michigan Department of Mental Health.

58. "Report of Children's Protective Services Investigations Received by Child Abuse and Neglect Central Registry During 1977," Michigan Department of Social Services, Office of Children and Youth Services, Protective Services Division, June 30, 1978.

59. "Battered Women Project: Research Report Presented to the Ingham County Women's Commission and the Sisters for Human Equality," Allen Hammer, Research Coordinator, East Lansing, Michigan, Oct., 1976.

60. "Child abuse hurts...," Council for the Prevention of Child Abuse and Neglect, Lansing, Michigan.

61. Greenberg, Joel, "Not Just For Show, Rosalynn Carter Chairs the Nation's First Presidentially Appointed Mental Health Commission," Science News, June 18, 1977, p. 397.

62. "Ingham County Prosecuting Attorney's Domestic Abuse Program," from the 1977 Annual Report, Prosecutor's Office, Ingham County.

63. Koch, Richard and Koch, Jean, "We Can Do More to Prevent the Tragedy of the Mentally Retarded," Psychology Today, Vol. 10, No. 7, Dec., 1976.

64. "Living with Burden of Care for Severely Brain Damaged Child," New York Times, March 28, 1978, 37:2.

65. Morowitz, David, M.D., "Prevalence of Psychiatric Depression among Impoverished Inner-City Residents," New York Times, Feb. 19, 1978, IV, 17:2.

F. Additional References, Other Health Status Problems

66. "Alcohol and Other Drug Use and Abuse in the State of Michigan," Summary Report, Office of Substance Abuse Services, Michigan Department of Public Health, March, 1975. A study conducted for the Office of Substance Abuse Services by Macro Systems, Inc. and Market Opinion Research.

67. "Michigan's Eighteen Year Old Legal Drinking Age," Michigan State Police, Office of Highway Safety Planning, August 16, 1978.

G. Additional References, Environmental Health Problems

68. Shah, B.P., Michigan Department of Natural Resources, "Environmental Considerations for the Disposal of PBB - Contaminated Animals and Wastes," Environmental Health Perspectives, Vol. 23, April, 1978, pp. 27-35.

69. "PBB: The Dimensions of a Health Problem," Michigan's Health, Fall 1977, Michigan Department of Public Health.

70. Health Hazards of the Human Environment, World Health Organization, Geneva, 1972.

71. "Progress Report on General Population Survey for PBB, January 1, 1979 through March 31, 1979," Michigan Department of Public Health, April 30, 1979.

72. Summary of "Crisis in the Workplace: Occupational Disease and Injury," a report to the Ford Foundation. Nicholas Askounes Ashford, Center for Policy Alternatives, MIT. Published by MIT Press, Cambridge, Mass., 1975.

73. Train, Russell E., "The Environment Today," Science, Vol. 201, July 28, 1978.

74. "Statistics Needed for Determining the Effects of the Environment on Health," Vital and Health Statistics: Series 4, No. 20, National Center for Health Statistics, DHEW Pub., No. (HRA) 77-1457.

H. Additional References, Health System Problems

75. Health Occupation Surveys, Michigan Cooperative Health Information System (MCHIS), Michigan Department of Public Health, Office of Statistics Research and Evaluation.

76. "Physicians (M.D. and D.O.), Michigan 1976," Michigan Cooperative Health Information System (MCHIS), Michigan Department of Public Health, Office of Statistics Research and Evaluation.

77. "Michigan State Plan for Hospital and Medical Facilities Construction, 1975-1976," Michigan Department of Public Health, Division of Health Facility Planning and Construction.

78. "Analysis of Physician Price and Output Decision," Research Digest Series, National Center For Health Statistics, DHEW Pub. No. (HRA) 77-3171.

79. Fineberg, Harvey and Parker, Gerald, "CT Scanners: Distribution and Planning Status in the United States," The New England Journal of Medicine, Vol. 297, No. 4, July 28, 1977.

80. Minsky, Betty Jane, "Education, coordination of services seen as top health needs," The State Journal, Lansing, Michigan, Nov. 19, 1978, p. B-9.

81. Schneer, Errol and Fielding, Jonathan, "Quantifying The Need For Hospital Beds," The New England Journal of Medicine, Vol. 297, No. 19, Nov. 10, 1977.

82. Shelton, C.R., "The CAT Scanner Controversy - Some Views," Michigan Medicine, Vol. 76, No. 5, Feb., 1977.

83. The Size and Shape of the Medical Care Dollar, Chartbook - 1975, DHEW Pub. No. (SSA) 76-11910.

84. "Report on State-Supported Blood Pressure Programs Under 314 (D)(7)(B)," Bureau of Disease Control and Laboratory Services.